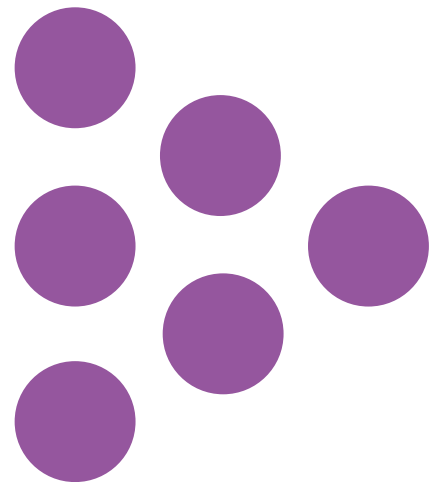

Research Report

**The impact of the Teach First Training
Programme on schools and pupils**

National Foundation for Educational Research (NFER)



The impact of the Teach First Training Programme on schools and pupils

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Contents

| | |
|--|----|
| Executive Summary | 5 |
| Key Findings | 6 |
| 1 Introduction | 9 |
| 2 Methodology | 14 |
| 3 Characteristics of Teach First schools | 26 |
| 4 The impact of recruiting a Teach First trainee on a school's workforce | 35 |
| 5 The impact of Teach First teacher recruitment on pupil outcomes | 41 |
| 6 Conclusions | 54 |
| References | 56 |
| Methodological appendix | 59 |

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Executive Summary

Teach First is an educational charity, established in 2002, which aims to make our education system work for every child. They find and train teachers to work in schools serving disadvantaged communities, develop their leadership teams through a variety of programmes and plug them into networks of diverse expertise and opportunities to create real change. Teach First’s flagship programme, and a key component of its mission of reducing inequalities in education, is the Teach First Training Programme. This two-year programme of initial teacher training involves recruiting and training high-potential university graduates and career changers as teachers and placing them in schools serving disadvantaged communities.

Teach First has commissioned the National Foundation for Educational Research (NFER) to conduct a two-part impact evaluation of the Teach First Training Programme, to explore how the impact of the programme has evolved during its second decade.

The first research phase analysed the career paths of Teach First teachers (McLean and Worth, 2023). We found that Teach First teachers tended to follow unique career paths compared to otherwise similar teachers who had trained through other routes. Specifically, Teach First teachers tended to move into middle and senior leadership roles more quickly than other, similar teachers and were more likely to have stayed working in disadvantaged schools.

This report summarises the findings from the second research phase. We analysed the impact on the workforce and pupil attainment in Teach First schools (i.e. schools that recruited one or more Teach First trainees), compared to otherwise similar schools which did not recruit Teach First trainees.

Previous literature has showed that Teach First has had a positive impact on the attainment of pupils in the schools in which they are placed (Muijs, *et.al.*, 2013; Allen *et al.*, 2014). These findings were in line with other recent evaluations of Teach for All partners, such as Teach for America and Enseña por México (Teach for Mexico), which showed a positive impact on attainment and whole-child outcomes for disadvantaged pupils (Chacon and Pena, 2017; Wright *et al.*, 2019; An and Koedel, 2021; Penner, 2021).

We first used ITT Performance Profiles and School Workforce Census data to analyse the impact of becoming a Teach First school (i.e. a school which partnered with Teach First to employ one or more Teach First trainees on the Training Programme) on the school’s workforce. To analyse how pupil attainment tended to change after a school became a Teach First school, we used data from the DfE’s National Pupil Database (NPD). We also used data from the Higher Education Statistics Agency to analyse the impact of becoming a Teach First school on the likelihood that pupils attended university.

Our analysis included all schools that recruited a Teach First trainee for the first time between 2012/13 and 2018/19. This was five further cohorts to those explored in the previous study of pupil attainment in Teach First schools (Allen and Allnutt, 2017).

Our analysis loosely followed previous research studies, with some methodological modifications. We began by considering the impact of partnering with Teach First on the workforce challenges

that Teach First schools may have been facing prior to their involvement with Teach First. This was because a key aim of the Teach First Training Programme is to support schools facing significant teacher supply challenges. We then compared pupil outcomes (including attainment and the proportion of pupils who go on to attend university) for Teach First schools with a group of schools that were otherwise similar but that did not recruit any Teach First trainees.

Key Findings

Teach First partners with schools that serve pupils in the most disadvantaged communities in the country. Teach First schools therefore had systematically different characteristics from other schools in the year they recruited their first Teach First trainee.

The majority of Teach First schools were in the highest quintile of pupil deprivation, based on both the Income Deprivation Affecting Children Index (IDACI) and free school meal (FSM) eligibility. Teach First schools were also more likely to be in the lowest attainment quintile, and a lower proportion of pupils from Teach First schools attended university.

Teacher workforce challenges were also considerably more acute in Teach First schools than other schools in England. Teach First schools were more likely than other schools to have had a teaching vacancy, to be among the school with the highest per-pupil expenditure on supply staff and to be among the schools with the highest proportion of inexperienced staff.

Teach First schools recruited Teach First trainees to supplement, rather than replace, sources of new teacher recruitment

In the years after they recruited their first Teach First trainee, both Teach First primary and secondary schools recruited statistically significantly more teachers from non-Teach First higher education and school- and employment-based routes than comparison schools that had similar pre-existing characteristics to Teach First schools. This may suggest that schools viewed Teach First as an additional tool available to them to address their teacher supply challenges.

Secondary schools were also more likely than primary schools to recruit more than one Teach First trainee when they became Teach First schools, and additional Teach First trainees in the years after their first. Recurring recruitment may suggest that many schools found that recruiting Teach First trainees provided value to their schools.

Recruiting a Teach First trainee did not appear to have had a significant impact on the recruiting schools' recruitment and retention situation. After recruiting their first Teach First trainee, there were no statistically significant differences in expenditure on supply staff, unfilled vacancies or temporarily-filled positions and turnover rates between Teach First schools and comparison schools with similar characteristics.

However, Teach First teachers may have had an impact on teacher retention and recruitment in other disadvantaged schools beyond the schools which initially recruited them. In our analysis of Teach First teachers' careers, we found that Teach First teachers were more likely than otherwise similar teachers who trained through other routes to continue working in disadvantaged schools

even after leaving their original placement school. The workforce impacts of Teach First teachers may therefore have been spread out amongst disadvantaged schools more broadly. Additionally, the workforce measures we included in the analysis were only a limited set of proxies for workforce challenges, which may not necessarily have represented a complete picture of workforce impacts.

After recruiting their first Teach First trainee, GCSE attainment in secondary school departments that recruited a Teach First trainee was statistically significantly higher than in similar departments in comparison schools.

This was likely reflective of a direct impact of Teach First teachers on the outcomes of the pupils they taught. There was no statistically significant impact associated with recruiting a Teach First trainee on GCSE attainment at the whole-school level, suggesting that the direct attainment impact was focussed on the trainee’s subject area.

There was some evidence to suggest that, after recruiting their first Teach First trainee, pupils who sat their GCSEs in Teach First schools may have been more likely to attend university, and a Russell Group university, than pupils who sat their GCSEs in similar comparison schools. However, there were significant caveats associated with this finding.

First, the proportion of pupils attending university in Teach First schools had been increasing faster over time than for similar comparison schools, even before schools became Teach First schools. Our estimates may therefore have reflected a continuation of this trend rather than any direct impact associated with the recruitment of a Teach First trainee.

The results were also highly dependent on how we implemented the statistical matching in the analysis. This meant that our results may also have been driven by differences in the sample of pupils in our analysis, rather than an underlying impact associated with the recruitment of a Teach First trainee.

There were no statistically significant differences in whole-school Key Stage 2 reading and mathematics attainment between Teach First schools and similar comparison schools. There were also no statistically significant differences in A level attainment for pupils who sat their GCSEs at a Teach First school compared to pupils who sat their GCSEs at similar comparison schools.

For Key Stage 2 attainment, this may have been because primary teachers generally teach one year group per year. Since the Teach First Training Programme is two years in duration, the potential direct impact of a Teach First teacher likely only extended to a small proportion of the pupils in the school, so any whole-school direct impact was likely to be smaller than for secondary pupils. For some primary pupils, there may also have been a significant lag between when they were taught by a Teach First teacher and when they sat their Key Stage 2 assessments in Year 6, further reducing any potential whole-school direct impact.

Similarly, few Teach First secondary schools had sixth forms, so in many cases Teach First teachers were unable to have had a direct impact on A level attainment. There would therefore be a lag of a few years between when secondary pupils were taught by a Teach First teacher and when they sat their A level assessments, which likely further reduced potential impact.

Overall, the findings highlight that there were positive differences between Teach First schools and similar comparison schools that were statistically significant but small and there were no indications that recruiting a Teach First trainee had any negative impacts on schools or pupils.

1 Introduction

1.1 Background

Teach First is an educational charity, established in 2002, which aims to make our education system work for every child. They recruit and train teachers to work in schools serving disadvantaged communities, develop their leadership teams through a variety of programmes and plug them into networks of diverse expertise and opportunities to create real change. Teach First’s flagship programme, and a key component to its mission of reducing inequalities in education, is the Teach First Training Programme. This programme involves recruiting and training ‘high-potential’¹ university graduates and career changers as teachers and placing them in disadvantaged schools.

Eligible participants must meet specific academic criteria and apply to be part of the programme. Eligible schools must meet a disadvantage threshold (defined by the proportion of pupils from disadvantaged backgrounds² and the Achieving Excellence Area (AEA) classification³ of the school) and then opt into recruiting through the programme. Accordingly, schools that recruit Teach First trainees (which we refer to as Teach First schools) tend to be amongst the schools with the highest proportions of pupils from disadvantaged backgrounds and tend to face more substantial recruitment and retention challenges than other schools in England.

Teach First aims to support schools serving disadvantaged pupils with their teacher supply challenges. The Teach First Training Programme is an employment-based teacher training route, in that trainees work in a school and receive a salary during their training. Participants attend a five-week⁴ Summer Institute to begin their training and finish their training working in the classroom. Trainees are placed in the same school for two years, where they continue to receive training and individualised support from in-school mentors and develop their teaching skills working with experienced teacher educators.

¹ ‘High potential’ is a term used by the DfE to refer to high potential teachers recruited to the High Potential Initial Teacher Training programme which is currently delivered under contract by Teach First. High Potential ITT trainees were formerly referred to as Teach First trainees in DfE’s public ITT statistics. See <https://explore-education-statistics.service.gov.uk/find-statistics/initial-teacher-training-performance-profiles>

² Measured by the Income Deprivation Affecting Children Index (IDACI).

³ AEA is a composite indicator combining several different indicators used to identify schools which are currently deemed to be under-performing but have significant capacity to improve. See https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/508392/Methodology_guidance_note_-_defining_achieving_excellence_areas.pdf.

⁴ The length of the Summer Institute training has been five weeks since the 2017/18 cohort but was six weeks for all of the cohorts in this analysis.

At the end of their first year in the programme, trainees are recommended for qualified teacher status (QTS) and receive a postgraduate diploma in education (PGDE)⁵ after their second year.⁶ Participants are known as ‘Teach First Ambassadors’ after they complete their two-year placement. Teach First is part of Teach For All, a network of educational charities around the world that share similar aims around the improvement of education systems (and of which Teach for America in the United States is the oldest partner).

Teach First placed its first cohort of trainees in schools in 2003 and, in its early years, Teach First trainees were placed exclusively in secondary schools in London. However, the scope of the programme has expanded substantially since its early days. Teach First now places new teachers in disadvantaged primary and secondary schools (which meet eligibility criteria) across all regions of England, particularly in areas deemed to be under-performing.

In addition to being a provider of initial teacher training (ITT), Teach First supports schools through teacher and leadership development programmes and its network of Teach First Ambassadors working in schools. Teach First was also selected by the Department for Education (DfE) as a primary provider of the Early Career Framework (ECF) programme and is accredited to deliver the DfE’s National Professional Qualifications (NPQs) (Teach First, 2022a).

1.2 About this evaluation

Existing evidence on the impact of the Teach First training programme on schools serving disadvantaged communities is based on two studies which considered the impact of the programme on the earliest Teach First schools (Muijs *et al.*, 2010; Allen and Allnutt, 2017). Teach First has therefore commissioned the National Foundation for Educational Research (NFER) to conduct a two-part impact evaluation of the Teach First training programme, to explore how the impact of the programme has evolved during its second decade.

The aim of the first phase of the evaluation (McLean and Worth, 2023) was to analyse the progression and retention of Teach First teachers, compared to the progression and retention of similar teachers who trained through other ITT routes and were working in similar schools when they first entered the state-funded sector.

This second phase of the evaluation considers the impact of teachers who trained through Teach First on the attainment of pupils in their school, compared to schools which did not participate in the Teach First programme.

⁵ The PGDE is an internationally-recognised academic teaching qualification. However, Teach First only began awarding PGDE qualifications upon the completion of the two-year programme in 2017/18. Therefore, all of the cohorts of Teach First teachers that we analysed in this report would have earned a postgraduate certificate in education (PGCE) alongside their QTS status after the first year of training, rather than a PGDE.

⁶ Postgraduate initial teacher training on other routes is typically one year in duration as opposed to two years for Teach First. Under the Early Career Framework (ECF) reforms, which took effect in September 2021, early-career teachers from all routes spend two years in induction once they enter teaching. However, this change had not yet taken place for any of the trainee cohorts in this analysis.

The five main research questions we considered in this analysis were:

- 1) What was the alternative to a Teach First trainee for otherwise similar schools who were not involved with the Teach First Training Programme?
- 2) How did the GCSE outcomes of pupils in departments with Teach First teachers compare to pupils in similar schools that were not involved with the Teach First Training Programme?
- 3) How did the GCSE, A level and Key Stage 2 outcomes of pupils in Teach First schools compare to pupils in similar schools not involved in the Teach First Training Programme?
- 4) How did the higher education choices of pupils in Teach First schools compare to pupils in similar schools not involved in the Teach First Training Programme?
- 5) Were there differential impacts in GCSE, A level, Key Stage 2 or higher education outcomes on subgroups of pupils, and did different levels of dosage of Teach First programmes moderate any of the above impacts?

1.3 Literature review and motivation

1.3.1 Previous literature

Gaps in educational attainment between pupils from deprived and non-deprived backgrounds in England are well-documented in the literature. Nationally, in 2019, prior to the onset of the Covid-19 pandemic, less than half of pupils from deprived⁷ backgrounds achieved a standard pass (grade 4 or above) in GCSE English and mathematics, compared to nearly three-quarters of pupils from non-deprived backgrounds (Starkey-Midha, 2020).

The disadvantage gap is driven by many complex, interacting factors. However, a key factor relevant to Teach First is that pupils in schools which serve the most income-deprived areas in England (and therefore have the highest proportion of pupils eligible for free school meals (FSM)) have less access to high-quality teachers than pupils in schools in the least-deprived areas (Sibieta, 2020; OECD, 2022). Schools with the highest proportion of their pupils eligible for FSM also tend to be challenging environments to teach in, which leads to higher teacher turnover (Allen *et al.*, 2016) and lower Ofsted ratings (Hutchinson, 2016). Teach First’s aim of placing teachers in the schools which serve disadvantaged pupils can therefore help to bridge this gap, both by having a direct impact on pupil attainment and by helping to relieve recruitment and retention challenges in Teach First-eligible schools.

The previous literature documenting the effect of Teach First on the attainment of pupils in the schools in which they were placed is relatively sparse. Nonetheless, two studies demonstrated that recruiting Teach First teachers to schools was associated with a slight improvement in pupil attainment (Muijs *et al.*, 2010; Allen and Allnutt, 2017). These findings were in line with other recent evaluations of Teach for All partners, such as Teach for America and Enseña por México (Teach for Mexico), which showed a positive impact on attainment and whole-child outcomes for

⁷ Pupil deprivation refers to income deprivation and is defined as those pupils eligible for free school meals.

disadvantaged pupils (Chacon and Pena, 2017; Wright *et al.*, 2019; An and Koedel, 2021; Penner, 2021).

This impact may have been driven in part by Teach First teachers' unique academic and motivational profile. Teach First aims to recruit graduates and career changers to its training programme who are judged to have 'high potential' as teachers, and aims to attract graduates and career changes who may not have otherwise joined the teaching profession, as well as those intent on becoming career teachers. Successful recruits must meet criteria based on their prior academic performance, and must also demonstrate other values and competencies such as leadership, humility, respect, empathy, motivation, resilience and commitment to teaching. This is assessed by an application form and completion of exercises at one of Teach First's 'Development Centres' (Teach First, 2022b). As a result, in its earliest cohorts, Teach First teachers were more likely than teachers who trained through other routes to have a first-class or upper second-class degree and surveys of schools who hired Teach First teachers indicated that they were typically hard-working, had an excellent attendance record and were determined to succeed (Hutchings *et al.*, 2006).

Impact on pupil attainment may also have been driven by Teach First trainees helping to relieve pressure on schools which struggled to recruit enough teachers in shortage subjects. Subjects including mathematics, physics, chemistry and languages consistently do not meet teacher recruitment targets (Worth and Faulkner-Ellis, 2022a), and accordingly experience shortages of teachers. Teacher shortages lead schools to mitigate the challenge by using supply staff and non-subject specialists (Worth and Faulkner-Ellis, 2022b). These shortages also tend to be greater in schools serving disadvantaged communities (Sibieta, 2020).

Accordingly, in its earliest cohorts, Teach First secondary teachers tended to be more likely than secondary teachers who trained through other routes to teach in shortage subjects (Hutchings *et al.*, 2006). This is partly because the number of placements Teach First makes in each phase and subject is dictated by school demand, as well as the supply of applicants in each subject.

The training programme itself is judged to be of high quality. Ofsted rates Teach First's ITT provision as 'outstanding' for both primary and secondary, citing in particular a number of schools which improved in overall effectiveness after being recruited to the Teach First programme (Ofsted, 2011, 2015). Teach First is also considered to be a prestigious graduate employer, placing ninth on the Times Top 100 Graduate Employers list in 2021 and within the top ten in the last ten years (Birchall, 2021).

Furthermore, the literature has also shown that the career trajectories of Teach First teachers differ from teachers who trained through other routes. Specifically, participants in the 2008/09 – 2012/13 Teach First cohorts were seven times more likely than other similar PGCE teachers to be in a senior leadership role within the first six years of their career (Allen *et al.*, 2016). Higher progression into middle and senior leadership was likely to be driven by a number of factors including differences in the competencies which Teach First considers as part of its recruitment (notably leadership).

Not only were Teach First teachers more likely to progress into higher leadership roles, but they were also twice as likely to be teaching in schools serving disadvantaged communities after the completion of their programme than teachers who trained through other routes (Allen *et al.*, 2016).

This suggests that a key impact of Teach First is that it provided a leadership pipeline for schools serving disadvantaged communities, which may otherwise have had challenges attracting quality leaders or faced barriers to succession planning. This enabled Teach First teachers to have had more influence on school decision-making, with impacts on pupil outcomes at a whole-school level, at an earlier stage in their careers than teachers who trained through other routes.

1.3.2 Motivation for this research

The motivation for the second phase of research on the pupil impacts of a school partnering with Teach First was to update the existing estimates from the previous studies and contribute to a broader understanding of Teach First's impact on the school workforce.

The analysis in this report was based loosely on the structure and methodology used in previous analysis of Teach First's impact on attainment (Allen and Allnutt, 2017), with some methodology deviations that are explained in section 2. However, our analysis included more recent cohorts of Teach First schools compared to existing estimates. We analysed schools which partnered with Teach First from 2012/13 to 2018/19, while the previous analysis considered the 2003/04 to 2012/13 cohorts. This report therefore contributes new evidence on the long-term (up to six years after first becoming a Teach First school) impact of recruiting Teach First trainees on pupil attainment.

In addition to the impact of Teach First trainees on pupil attainment, we also considered the impact of recruiting Teach First trainees on the workforce challenges that Teach First schools may have been facing prior to their involvement with Teach First. This is to provide a more complete picture of the impact Teach First has likely had on schools serving the most disadvantaged pupils.

2 Methodology

The analysis in this report followed many of the features of the methodology in the preceding Teach First school-level impact evaluation (Allen and Allnutt, 2017). Specifically, we used a matched comparison group research design to ensure that attainment comparisons between Teach First schools and similar comparison schools were made on a like-for-like basis.

In this section, we outline key details of the data sources, variable definitions, methodology and limitations of the analysis. Additional methodological details, including details of the dataset linkages, matching output and a discussion of parallel trends violations are included in the methodological appendix.

2.1 Data sources

A key source of data was the School Workforce Census (SWC) linked to the Initial Teacher Training Performances Profiles (ITT-PP) data. The SWC and ITT-PP data served primarily to identify Teach First schools (i.e. schools that partnered with Teach First to employ one or more trainees on the Training Programme) and match them to other schools that did not recruit Teach First teachers but had otherwise similar school characteristics. We identified Teach First schools using a dataset provided by Teach First consisting of all Teach First trainees who were recruited to the Teach First Training Programme, and the Unique Reference Number (URN) of the schools into which they were placed for their training, between 2003/04 and 2018/19.⁸

The main source of data used in the evaluation was the National Pupil Database (NPD). The NPD is administrative data collected by the Department for Education (DfE) on pupil attainment in all state-funded schools. We used the NPD data to provide information on pupil characteristics and attainment at Key Stage 2 and on GCSEs and A-levels. We used data on pupil attainment from 2009/10 to 2018/19 in the analysis. URN school identifiers enabled us to determine, based on our statistical matching of the SWC data, which schools were Teach First schools and which were similar comparison schools.

In addition to data from the NPD, we used university attendance records from the Higher Education Statistics Agency (HESA) in the analysis. The HESA data was linked to the NPD to enable longitudinal tracking of individuals as pupils moved through state-sector schooling and into higher education. The HESA data therefore enabled us to observe whether pupils who attended Teach First schools ever attended university or a Russell Group university after leaving secondary schooling.

⁸ Details of how we identified Teach First teachers can be found in our analysis of Teach First teachers' career trajectories (McLean and Worth, 2023).

2.2 Definitions of samples and statistical matching

Our evaluation involved comparing pupil attainment and university attendance rates between schools that recruited Teach First trainees and similar comparison schools. We defined our sample of schools that recruited a Teach First teacher based on analysis of the ITT-PP and SWC data.

We derived a list of Teach First schools based on the schools in the Teach First data in which Teach First trainees were ever placed. We considered a Teach First school to be a school that had ever recruited a Teach First trainee, and comparison schools to be all schools which had not recruited a Teach First trainee between 2003/04 and 2018/19. This is a different definition to the previous analysis of the impact of Teach First on pupil attainment, which defined comparison schools as schools which did not employ any Teach First trainees but would go on to employ one or more Teach First trainees in a later year (Allen and Allnutt, 2017). We used our broader definition of comparison schools (alongside the statistical matching to ensure our comparisons were made on a like-for-like basis) in part because it provided a larger sample of comparison teachers for the analysis.

We defined the year that a school recruited its first Teach First trainee based on the year that the first trainee began their two-year training programme in that school. For example, we considered a school in which a Teach First trainee began their training in 2012/13 (and which had never recruited a Teach First trainee prior to 2012/13), to have become a Teach First school in 2012/13. Further details on how we used the SWC to impute missing school identifiers or likely data entry errors in the Teach First data can be found in the methodology appendix.

We focussed primarily on schools that recruited their first Teach First trainee between 2012/13 and 2018/19.⁹ This is mainly because the SWC and ITT-PP data was only available from 2010/11 onwards. In our statistical matching, we required school characteristics from two years prior to the year in which a school recruited its first Teach First trainee. This meant that the first year in which we were able to observe school characteristics for all schools in the two years prior to their first Teach First trainee recruitment was 2012/13.

As we discussed in section 1, the characteristics of Teach First schools differed significantly from non-Teach First schools. This is primarily due to Teach First's eligibility criteria for schools, since Teach First partners primarily with schools that serve disadvantaged communities. Tabulations showing the differences in key school characteristics between Teach First and other schools can be found in the methodology appendix.

Differences in some school characteristics are likely to be associated with pupil attainment. For example, the fact that there are generally higher proportions of pupils eligible for free school meals (FSM) in Teach First schools may help explain part of the lower pupil attainment in those schools. To ensure that our estimated impacts of recruiting a Teach First trainee on pupil attainment were reflective of the teacher and not underlying differences in school characteristics, we matched Teach First schools to comparison schools that had similar characteristics prior to comparing

⁹ We excluded schools from the analysis which recruited their first Teach First trainee prior to 2010 as data collection for the SWC and ITT-PP only began in 2010. Further details on how we excluded these schools can be found in the methodological appendix.

attainment outcomes. We implemented the school matching using a statistical technique called ‘Mahalanobis matching’ (Rubin, 1980). We matched schools based on the pupil and school workforce characteristics of schools observed in the year in which they recruited their first Teach First teacher. Recent evidence has shown that using this technique ensures that bias is very likely to be low (Weidmann and Miratrix, 2020).

The key characteristics we matched on included region, level of school deprivation (measured by both the Income Deprivation Affecting Children Index (IDACI) and the proportion of pupils eligible for FSM). We included region and school deprivation characteristics in the matching as these are some of the key factors Teach First use to assess a school’s eligibility to recruit Teach First trainees. The latest Teach First eligibility criteria for schools is defined, in part, using the proportion of pupils from disadvantaged backgrounds measured using IDACI.¹⁰ However, while Teach First prioritises income deprivation as a measure of disadvantage in its recruitment practices, the specific definition has evolved over time. We therefore also included the proportion of pupils eligible for FSM as an additional measure of school deprivation in the matching to control for any remaining differences in deprivation between Teach First and comparison schools.

We also matched on the attainment characteristics of schools, as schools eligible for Teach First tended to have lower attainment than other schools prior to employing their first Teach First trainee. We included average Key Stage 2 reading and mathematics attainment for primary schools and Attainment 8 scores for secondary schools in the matching.

Schools serving more deprived communities tended to have more significant challenges recruiting and retaining teachers, with knock-on effects on pupil attainment. We therefore also included a set of proxies in the matching for the workforce challenges a school may have faced, including per-pupil expenditure on supply staff, the proportion of a schools’ staff who have less than two years of experience (a proxy for school turnover) and whether the school had a teaching vacancy.¹¹

We matched Teach First schools to comparison schools separately for primary and secondary schools. Within primary and secondary schools, we also matched exactly on the year a school recruited its first Teach First trainee and region. For example, we matched all schools which recruited their first Teach First trainee in 2012/12 in London with comparison schools in the same region and year. Within each region and year combination, we matched each Teach First school with the schools that were the most similar in characteristics in that year.

The matching ensured that our comparisons of pupil attainment and university attendance in Teach First and comparison schools were made on an as much of a like-for-like basis as possible and our results were unlikely to have been driven by compositional differences between our samples (Weidmann and Miratrix, 2020). We checked that these key characteristics were similar between Teach First and comparison schools after implementing the matching, and the matching results are shown in the methodology appendix. We also conducted robustness checking on alternative matching techniques to ensure that our choice of statistical tool did not influence the results, along

¹⁰ See <https://www.teachfirst.org.uk/knowledge-base/npgs/eligibility>

¹¹ Vacancy information observed in the SWC is as of November and therefore does not provide any information about vacancies later in the academic year.

with checks for parallel pre-trends in certain key outcomes. We discuss this in more detail in the methodology appendix.

2.3 Definitions of outcomes

The matching yielded a list of school identifiers recording Teach First schools and the similar comparison schools that they were matched with, which served as a key input into our main analysis. Teach First aims to have an impact on pupil attainment primarily by helping to relieve workforce pressures in schools serving disadvantaged communities. As we discussed in section 1, recruiting a Teach First trainee is hypothesised to have an impact on schools’ workforce challenges and, accordingly, improve pupil outcomes. Our impact evaluation tested both how recruiting Teach First trainee impacted schools’ workforces alongside pupil attainment. In this section, we outline the definitions of our main outcomes, and how they were derived from each of our data sources.

2.3.1 Workforce outcomes

The set of indicators we used in the regression modelling reflected the workforce challenges that Teach First schools faced. Our workforce indicators were derived from SWC data.

Our first set of indicators related to the total number of Teach First trainees and trainees or newly-qualified teachers (NQTs)¹² who trained through either a school- and employment-based or higher education route at the school in each year. We derived this measure from the ITT-PP data linked to the Teach First data by counting the number of trainees and NQTs from Teach First and non-Teach First routes who began working at a school in each year. This was based on the assumption that the Teach First / ITT-PP data correctly recorded the school in which each teacher was teaching. We imputed records where this was unlikely to be the case, and further details of this imputation can be found in the methodology appendix.

Another key workforce variable was per-pupil supply staff expenditure, which was a proxy for a school’s reliance on supply staff (rather than permanent teaching staff) to supplement their teaching workforce. We derived this based on publicly available information on a school’s total expenditure on supply staff, divided by the overall headcount of pupils in that school, in each year.¹³

Finally, we derived our measures of the number of unfilled vacancies in a school based on data in the SWC. This was done by aggregating the number of vacancies (both unfilled vacancies and vacancies that have been temporarily filled) by school and year. Vacancies in schools were

¹² Teachers starting their induction on or after September 1, 2021 were known as early career teachers (ECTs). Our analysis considered trainees who all began their training before this date, so we retain the older term.

¹³ Data on supply staff expenditure and pupil numbers originated from the DfE’s public registry of school information: <https://www.get-information-schools.service.gov.uk/>

observed as of November of each year, and therefore did not reflect any additional vacancies which schools may have posted later in the academic year.

2.3.2 Pupil attainment outcomes

Our pupil attainment and university attendance outcomes for the regression analysis were derived from the NPD and HESA data, respectively. For primary schools, we used individual pupil attainment in Key Stage 2 mathematics and reading assessments as our primary measure of attainment. We excluded writing assessments from the analysis as they are considerably more subjective than reading and mathematics attainment since outcomes are teacher-assessed.

Revisions to the National Curriculum assessments led to significant changes to the Key Stage 2 grading scheme from 2016. Additionally, raw point scores were subject to year-to-year variation due to differences in the difficulty of the exams or other wider factors. To facilitate a meaningful comparison of Key Stage 2 attainment over time, for 2016 and earlier years, we used pupils' Key Stage 2 reading and mathematics levels, mapped to numerical point scores, for the analysis. For later years, we used scaled point scores. The use of grade levels and scaled point scores (rather than raw point scores) meant that the year-to-year variation in scores due to differences in exam difficulty was likely to be minimal.

Crucially, this also meant that scores were numeric and could be treated as continuous variables, enabling us to standardise them to the same scale each year. This led to a measure comparable across years which reflected how far each individual's Key Stage 2 point score was from the average that year. The standardisation involved calculating the mean and standard deviation in Key Stage 2 scores in each year and, for each pupil's score, subtracting that year's mean score and dividing by the standard deviation. Standardising attainment scores meant that our estimated effects were reflective of 'effect sizes', which are a standard unit of measure in education trials, reflecting the size of an impact in standard deviations.

For secondary pupils, we used a measure of each pupil's overall 'capped' GCSE attainment. This measure reflected pupils' GCSE scores in eight subjects, English and mathematics and their six other best GCSE subjects. This measure became known as an 'Attainment 8' score from 2017. Using a capped GCSE score as our primary measure ensured taking more than eight GCSEs did not inflate a pupil's overall GCSE score relative to a pupil who took fewer GCSEs.

The GCSE grading scheme has also changed significantly over time, with the switch to Attainment 8 measures beginning in most schools in 2017. Similarly to Key Stage 2 attainment therefore, we mapped capped GCSE grade levels for each pupil to the relevant point score in each year and implemented the within-year standardisation.

We also considered pupil attainment at Key Stage 5 (A level) in the analysis. However, the analysis of A level attainment was slightly different than for GCSE attainment. A considerable proportion of Teach First and similar comparison secondary schools did not have a sixth form, and were unlikely to have experienced differences in pupils' A level attainment driven directly by the impact of employing a Teach First teacher.

We therefore analysed the A level attainment of pupils who sat their GCSEs at a Teach First secondary school, regardless of at which institution they completed their Key Stage 5 exams. Our main observed outcome of A level attainment was a pupil's average point score across all A level subjects in which they had a score.¹⁴ We took the best average point score a pupil ever achieved for pupils who sat their A levels multiple times.

Our main indicator of university attendance, based on the HESA data, reflected whether pupils ever went on to attend university. It was a dichotomous variable (unlike the Key Stage 2, GCSE and Key Stage 5 attainment variables) which took on a value of one if a pupil ever attended a university and zero otherwise. Similarly for Key Stage 5 attainment, university attendance is a post-secondary outcome. University attendance outcomes for pupils in Teach First schools therefore reflected pupils who sat their GCSE exams at a Teach First secondary school. Likewise, university attendance for pupils not in Teach First schools reflected pupils who sat their GCSE exams in a similar comparison school. We also defined a separate variable, defined in the same way as our main university attendance variable, which observed whether a pupil ever attended a Russell Group university.¹⁵

The number of years over which we were able to observe our main outcomes depended on when a school recruited its first Teach First trainee. For example, for a school which recruited its first Teach First trainee in 2012/13, we were able to analyse up to six years of workforce and pupil attainment outcomes (since the last year of pupil attainment and university attendance records available to us is 2018/19).

However, we were unable to observe our main Key Stage 5 and university attendance outcomes for the same number of years as our Key Stage 2 and 4 outcomes. This is because our Key Stage 5 outcomes were defined based on pupils who attended a Teach First secondary school between 2012/13 and 2018/19. Since pupils generally sit their A level exams two years later than their GCSEs, we analysed A level outcomes up to four years after a school recruited its first Teach First teacher (two fewer years than for GCSE outcomes). Similarly, since most pupils generally attend university three years after sitting their GCSEs, we observed university attendance outcomes up to four years after a school recruited its first Teach First teacher (three years fewer than for GCSE outcomes).

2.4 Regression modelling

With our matched sample, we used 'difference-in-differences' regression modelling to estimate the impact of becoming a Teach First school. In this section, we outline the key components of the modelling and discuss our implementation to estimate both workforce and pupil attainment impacts.

¹⁴ This is similar to how the DfE reports its public statistics on A level attainment. See: <https://explore-education-statistics.service.gov.uk/find-statistics/a-level-and-other-16-to-18-results>

¹⁵ The list of Russell Group universities can be found at: <https://russellgroup.ac.uk/about/our-universities/>

2.4.1 Difference-in-differences modelling

We estimated the impact of recruiting a Teach First teacher using a series of linear¹⁶ regression models. The models implemented a statistical technique known as difference-in-differences, which estimated the association between schools recruiting a Teach First teacher and the outcome variable. A key component underpinning the difference-in-differences model is the assumption that the outcome variable for Teach First schools would have followed the same trend as for similar comparison schools had they not recruited a Teach First trainee (Angrist and Pischke, 2009). For example, the impact would be estimated from the amount that the outcome increased by in Teach First schools after recruiting a Teach First teacher, over and above the amount that the outcome increased by in similar comparison schools in the same time period.

We constructed the difference-in-differences models by generating an interaction term between two binary variables: a ‘treatment’ indicator (i.e. whether the school was a Teach First school) and a set of ‘time’ indicators (i.e. a series of binary variables observing that record’s year of observation, relative to the ‘reference year’). We referred to the year in which a Teach First school recruited its first Teach First trainee, and the year in which a similar comparison school was matched to a Teach First school, as its ‘reference year’. We specified our set of time indicators to record the number of years pre- or post-reference year it corresponded to. This meant that we had a series of interaction terms in our models – one for observations from three years pre-reference year to six years post-reference year (for Key Stage 2 and GCSE attainment outcomes, fewer for workforce, A level and university attendance outcomes).

We set the ‘reference year’ to be the baseline year in our models, meaning that our impact estimates reflected whether recruiting a Teach First trainee led to any significant change in our main outcomes relative to the reference year. We reported estimates on the interaction between the ‘treatment’ and ‘time’ indicators from one to six years after the reference year (fewer for A level and university attendance outcomes) as our main estimates.

We estimated standard errors clustered at the school level in order to avoid issues with serial correlation in the outcome (Bertrand, Duflo and Mullainathan, 2004). We assessed statistical significance of the impact using t-tests of whether the interaction term parameter estimates were statistically significantly different from zero. Estimates on the difference-in-differences interaction terms for the years prior to the reference year served as a check that the parallel trends assumption on the models was satisfied. See the methodology appendix for further discussion on the importance of the parallel trends assumption and how we checked that it was satisfied in the modelling.

¹⁶ We used a linear probability model (LPM) to estimate the impact of recruiting from Teach First on the binary university attendance/Russell Group attendance variables. This was because of software limitations involved with using matching weights in a logistic regression model. We also estimated a multilevel logit model as a robustness check, which yielded similar results to the LPM. As the multilevel logit model was very computationally expensive to run, we reported only the results from the LPM.

2.4.2 Workforce impacts

A key mechanism by which Teach First aims to have an impact on schools serving disadvantaged communities is by providing a pipeline of teachers into schools to help address recruitment and retention challenges. We therefore first analysed the impact of recruiting a Teach First teacher on a school’s workforce and then estimated both direct and whole-school impacts on pupil attainment.

The models we used to estimate workforce and attainment impacts were similar in structure, but included different sets of explanatory variables, in addition to different outcomes. For the workforce impact models, we included our set of difference-in-differences interaction terms as our primary variables of interest. Additionally, we included all the school characteristics we used in the matching in the modelling, in order to account for any imbalance in these key attributes that remained after the matching and to improve the precision of the estimates. We also included year ‘fixed effects’ in the models. Including fixed effects is a statistical technique that is designed to control for any effects that were likely to affect all pupils in a similar way. For example, we included year fixed effects to control for any systematic differences in workforce characteristics affecting all schools similarly in a particular year.¹⁷

2.4.3 Pupil attainment impacts

We used a different model to estimate Teach First teachers’ direct impacts on pupil attainment. Reliably estimating a Teach First teacher’s direct impact on pupil attainment would ideally use matched teacher-pupil data, enabling us to analyse pupil attainment specifically for those pupils who were directly taught by a Teach First teacher.

However, matched teacher-pupil data is not available in the NPD, and so we estimated direct pupil attainment impacts using attainment data at the department level (e.g. GCSE attainment in science subjects when a Teach First science teacher is present at the school). Departments are a smaller unit of analysis and so our analysis was therefore much more likely to reflect the attainment impact of pupils who were directly exposed to the Teach First teacher than analysing overall GCSE attainment impacts at the whole-school level.

We defined a Teach First teacher’s department based on which subject they received their qualified teacher status (QTS) in. For example, we assumed that a teacher who received their QTS in science would be teaching in the science department of the Teach First secondary school in which they were placed. We included Teach First teachers who received QTS in English, mathematics and science in the department-level analysis, as these are the GCSE subjects that all pupils must take in secondary school. We considered Teach First departments to be those that recruited a Teach First trainee, and similar comparison departments to be those departments that did not. This meant that a department may have been considered a ‘comparison’ department even

¹⁷ Note that we only used data in our analysis up to 2018/19 and so our estimates did not reflect any impact of the Covid-19 pandemic. However, the influence of the pandemic on recruitment and retention would be a good example of how including fixed effects in a statistical model is useful.

if it was in a Teach First school, if there were no Teach First teachers working within that department.

The structure of the data enabled us to estimate department-level effects using a ‘triple-difference’ model. In this case, the triple-difference model used pupils who were in Teach First schools but not in Teach First departments as an additional control group, in addition to pupils who were not in Teach First schools at all. This led to better controls of common trends between Teach First departments and similar comparison departments and therefore a better representation of what the counterfactual GCSE attainment may have looked like if the department had not recruited a Teach First teacher (Wooldridge, 2015). The triple-difference model also had larger sample sizes, which improved the statistical power available to attribute statistical significance to the estimates. The model is similar to that used in previous impact evaluations of Teach First on GCSE attainment (Allen and Allnutt, 2017).

The triple-difference model used subject-specific GCSE attainment as its primary outcome, with our main difference-in-differences interaction terms as the primary explanatory variables of interest. The difference-in-differences interaction terms were defined at the department level rather than at the school level but otherwise were identical in structure to the school-level interaction terms (i.e. a ‘treatment’ indicator interacted with a ‘time’ indicator). We reported estimates on the interaction between the ‘treatment’ and ‘time’ indicators from one to six years after the reference year as our main estimates.

We also included the school-level matching characteristics in the modelling to improve the precision of the estimates, as well as school fixed effects. School fixed effects helped to control for any unobserved differences in school-level outcomes that were fixed over time and were not explained by differences in any observed school characteristics.

We also included a series of variables for the pupil characteristics likely to be associated with GCSE attainment and which were observed in the NPD. Specifically, we included a pupil’s prior attainment (Key Stage 1 attainment for the Key Stage 2 analysis and Key Stage 2 reading and mathematics attainment for the GCSE analysis, each standardised as described in section 2.3), gender, ethnicity (major ethnic groups), whether English was an additional language for the pupil, whether they were eligible for FSM and considered to be from a deprived family background (based on IDACI) in that year, whether they had special educational needs, and their month of birth.

In addition to the triple-difference model, we also analysed whether there were any statistically significant impacts on pupil attainment at a whole-school level. The whole-school level pupil attainment impacts were likely to be more diluted than the department-level impacts because they reflected pupil impacts on a substantial number of pupils in Teach First schools who were never directly taught by a Teach First teacher. Nonetheless, whole-school level impacts may have reflected how schools were able to free up resources to support pupil attainment where they otherwise may have been devoted to recruiting and retaining teachers.

The structure of the whole-school level attainment models was similar to our whole-school level workforce models. We estimated a model analysing pupil attainment in Teach First schools compared to similar comparison schools, with our main school-level difference-in-differences

interaction terms as the primary explanatory variables of interest. Like the triple-difference model, we also included school characteristics (those used in the matching), pupil characteristics and school fixed effects as additional explanatory variables in the modelling.

We estimated the triple-difference model for all pupils and then also for the subset of pupils in the sample who were eligible for FSM in the year they sat their GCSEs, as recorded in the NPD data. This was in order to determine whether the impact on GCSE attainment was different for FSM-eligible pupils than for all pupils.

Finally, we used identical models to estimate the whole-school level impacts of schools recruiting a Teach First teacher on pupils' A level attainment and university attendance outcomes. The models were based on pupils who sat their GCSE exams in Teach First secondary schools and then may have gone on to other institutions for Key Stage 5. The school characteristics we included in the modelling were reflective of the characteristics of the secondary school in which the pupil sat their GCSEs. We also estimated the model separately for all pupils and the only for pupils eligible for FSM.

In addition to these 'baseline' models, we also analysed whether there were any statistically significant differences in impact between different cohorts of Teach First teachers and between regions. We did this by estimating each baseline model (for workforce outcomes, direct pupil attainment, whole-school attainment, and university attendance) including an additional explanatory variable consisting of our main difference-in-differences interaction term further interacted with a region and year variable. We then tested whether any of the region and year interaction terms were statistically significant using t-tests.

We also analysed whether the degree to which a school 'engaged' with Teach First moderated any of the estimated impact. We did so by deriving two proxies for a school's engagement with Teach First, the first recording the number of Teach First trainees the school recruited in the year it became a Teach First school (i.e. one Teach First trainee, two Teach First trainees and more than two Teach First trainees). The second proxy recorded whether the school ever engaged with Teach First programmes other than the Training Programme (Teach First's National Professional Qualifications (NPQ), Career Leaders and Leading Together programmes)¹⁸. We estimated separate models for schools that recruited one, two and more than two trainees, and who ever engaged and did not ever engage with other Teach First programmes. We then conducted t-tests to determine whether the impact estimates for schools in each of these groups were statistically significantly different from each other.

¹⁸ We derived this variable based on whether a school engaged with other programmes even after the year it became a Teach First school. This is because there were very few schools who engaged with multiple Teach First programmes in the first year their recruited a trainee.

2.5 Limitations

A key limitation of the research is that matched pupil-teacher data is not available to assess how Teach First teachers had direct impacts on pupil attainment within their classrooms. This means that our estimates may have been diluted by pupils in Teach First schools who were not directly exposed to a Teach First teacher. We partially mitigated this by using the triple-difference model to estimate pupil attainment impacts within Teach First departments, as departments were a smaller unit of analysis and more likely to reflect direct pupil impacts. Nonetheless, there may have been pupils within a Teach First department who were not directly exposed to a Teach First teacher, particularly if the department had multiple teachers.

For a similar reason, our estimates of whole-school level impacts on A level and university attendance may also have been diluted by pupils in Teach First schools not directly exposed to Teach First teachers. Nonetheless, the estimates were still useful as an indicator of whether the direct impact of Teach First tended to ‘spill over’ to other departments in Teach First schools.

Additionally, for our analysis of the whole-school level impacts on workforce, we focussed on a number of variables derived from the SWC which served as proxies for schools’ workforce challenges more generally (we outlined what these characteristics were in section 2.3). As these characteristics were only proxies, they may not have fully reflected the impact on a school’s workforce.

Our estimates also did not reflect the impact in schools which recruited any Teach First teachers from its first nine cohorts. This is because data from the SWC and ITT-PP was not available earlier than 2010 and so these schools could not be matched to similar comparison schools.¹⁹ These schools were excluded entirely from the analysis to avoid problems with contaminating the sample of comparison schools with schools which were actually previously Teach First schools. The number of excluded schools was relatively small, but nonetheless their exclusion means we were unable to analyse the impact of the Teach First Training Programme in its earliest years, and unable to analyse very long-term impacts (i.e. more than six years after first Teach First teacher recruitment).

Our analysis used multiple simultaneous tests on the same dataset. We used a significance level for each of the individual tests, meaning that for each test there is a 5 per cent (1 in 20) chance that the null hypothesis (i.e., that there is no difference between the groups) is rejected when it is in fact true. However, as the number of comparisons increases, so too does the likelihood that a statistically significant result is due to chance. While it is possible to apply statistical corrections to account for multiple comparisons these have not been applied here, and the results should be considered in the context of multiple testing.

A final limitation of the analysis involved our use of difference-in-differences models for our analysis. A key assumption underpinning all difference-in-differences models involves the parallel trends assumption. This assumption must hold for the model to yield estimates that can plausibly be interpreted as reflecting the impact of the Teach First Training Programme.

¹⁹ Pre-2010 estimates were analysed in the previous Teach First impact study (Allen and Allnutt, 2017)

We implemented the statistical matching prior to running our difference-in-differences models partly to reduce the likelihood of parallel trends violations. However, in our triple-difference and university attendance analysis, we found evidence that parallel trends did not hold. Some caution should therefore be exercised in interpreting any of the results where parallel trends violations are present as reflective of causal impacts, as we discuss when describing the findings below.

3 Characteristics of Teach First schools

Teach First schools (i.e. schools which partner with Teach First to employ a trainee on the Training Programme) tended to have systematically different characteristics from other schools in England. This is because, as we noted in section 1, Teach First places its trainees exclusively in schools which meet its eligibility criteria. Teach First also aims to have a positive impact on the education system by placing teachers into schools which face challenges with recruitment. The workforce characteristics of Teach First schools therefore also tended to differ significantly from other schools in England.

In this section, we outline the key differences between our sample of Teach First schools and comparison schools in the year in which schools became Teach First schools. We show how Teach First schools differ from other schools in terms of phase, deprivation, attainment and workforce characteristics. The purpose of this is two-fold: first to help motivate the importance of the statistical matching (detailed in section 2) and secondly, to set up the hypotheses we test with the regression modelling in sections 4 and 5.

3.1 The number of Teach First schools by year and region and phase

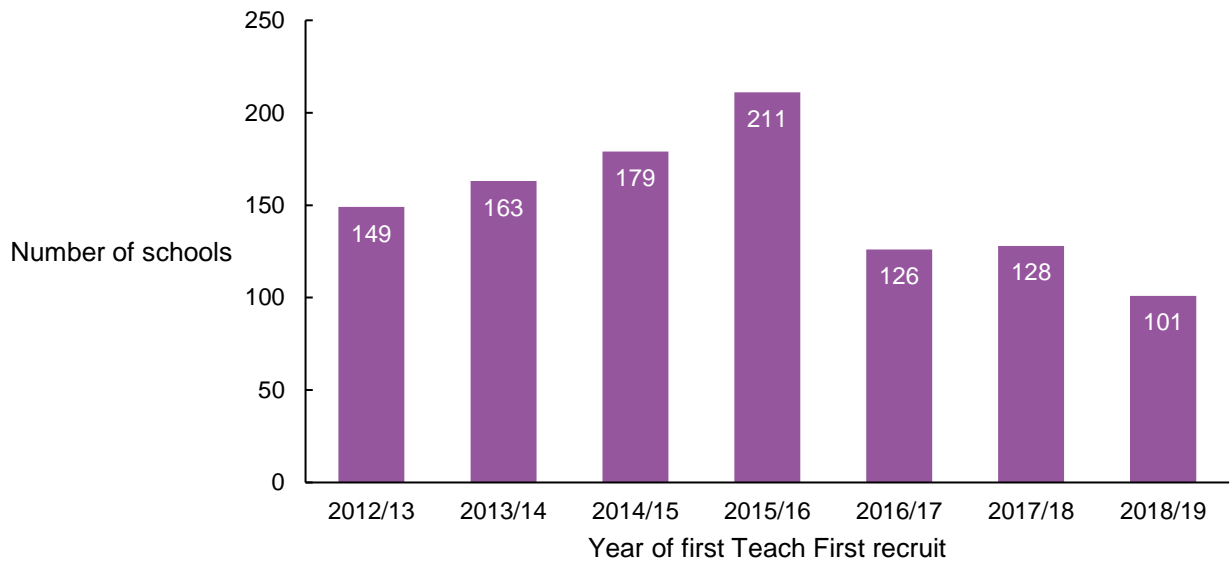
Teach First has placed trainees in schools since the 2003/04 academic year. We identified which schools were Teach First schools (meaning they recruited a Teach First trainee for the first time between 2012/13 and 2018/19), and the year in which they recruited their first trainee.²⁰

In total, we identified 1,057 Teach First schools, which were spread relatively evenly over academic years. As Figure 1 shows, between 100 and 200 schools per year recruited their first Teach First trainee between 2012/13 and 2018/19.

Between 2003/04 and 2005/06, Teach First placed its trainees exclusively in schools in London. However, the programme has since expanded to schools in all regions in England, based on need. Figure 2 shows the distribution of Teach First schools across regions. Among schools that employed their first Teach First trainee between 2012/13 and 2018/19, just over a quarter were in London. Even though since 2005/06 Teach First has placed its trainees in regions across the country, London was still the largest region in 2018/19.

²⁰ This figure excludes all schools which took on a trainee prior to 2010/11 and after 2018/19. See section 2 for details on how we identified Teach First schools.

Figure 1 Around 100 to 200 schools per year recruited their first Teach First trainee between 2012/13 and 2018/19



Source: NFER analysis of SWC and Teach First data (for 2012/13 – 2018/19).

Other regions with a considerable number of Teach First schools included the West Midlands and the South East, in which, together, just over a quarter of Teach First schools were located. The smallest regions included the South West and North East, where seven and five per cent, respectively, of Teach First schools were located.

Figure 2 There were significant differences in the distribution of Teach First schools across regions



Note: Percentages on the bars represent the proportion of all Teach First schools that were in each region.

Source: NFER analysis of SWC and Teach First data (for 2012/13 – 2018/19).

The majority of Teach First schools we identified were primary schools. Specifically, of 1,057 Teach First schools, 64 per cent (677 schools) were primary schools and 36 per cent (380 schools) were secondary schools.

However, the majority of Teach First trainees were secondary trainees. This is partly because there are more primary schools in England than secondary schools. Primary schools are generally also smaller than secondary schools, with smaller workforces. They therefore tend to recruit fewer Teach First trainees and less often than secondary schools. We discuss this in more detail in section 4.

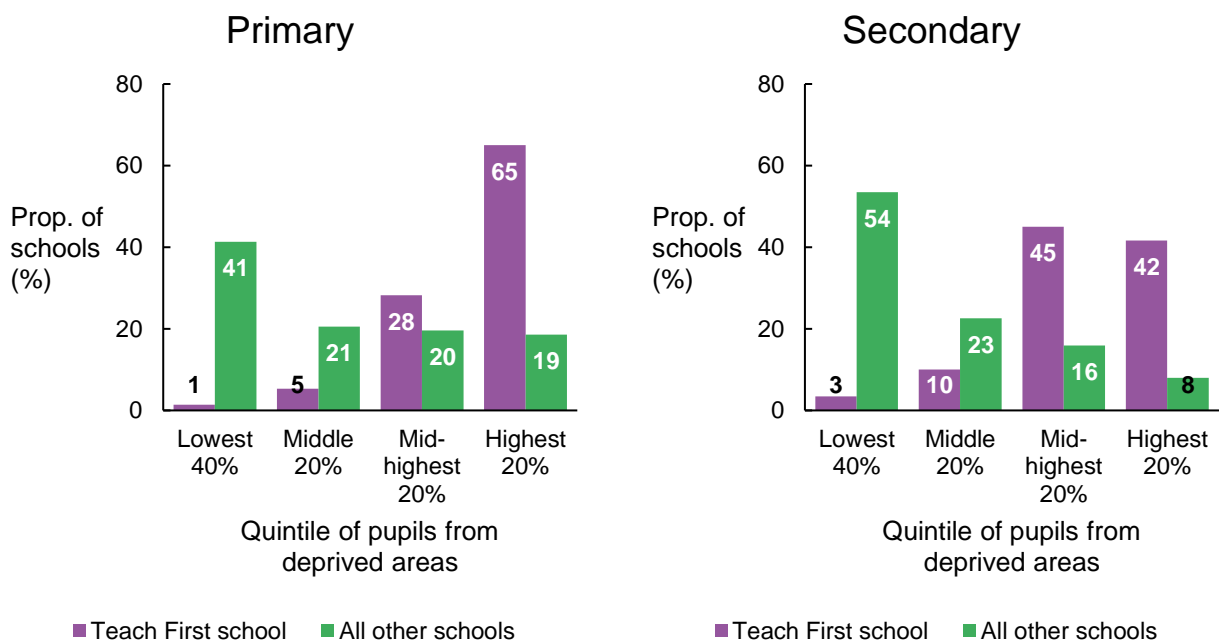
3.2 Differences in pupil deprivation between Teach First and comparison schools

As we outlined in section 1, Teach First schools must meet certain criteria to recruit Teach First trainees. Part of this requirement is that the school serves a high number of pupils from deprived areas (defined by the Income Deprivation Affecting Children Index (IDACI)).²¹

²¹ More information on school eligibility can be found at <https://www.teachfirst.org.uk/knowledge-base/schools/hire-trainee-teachers>

Figure 3 shows that there were, therefore, significant differences in pupil deprivation between Teach First schools and other schools in England. Nearly two-thirds of Teach First primary schools were in the highest quintile for pupil deprivation (i.e. were among the most deprived schools in England).²² This compared to about a fifth of comparison primary schools. Only about one per cent of Teach First primary schools were among the schools in the lowest two quintiles for pupil deprivation, compared to 41 per cent of comparison schools.

Figure 3 About two-thirds of Teach First-eligible schools were in the highest quintile for pupil deprivation



Note: We report the two lowest quintiles combined, as sample sizes were too small to report separately.

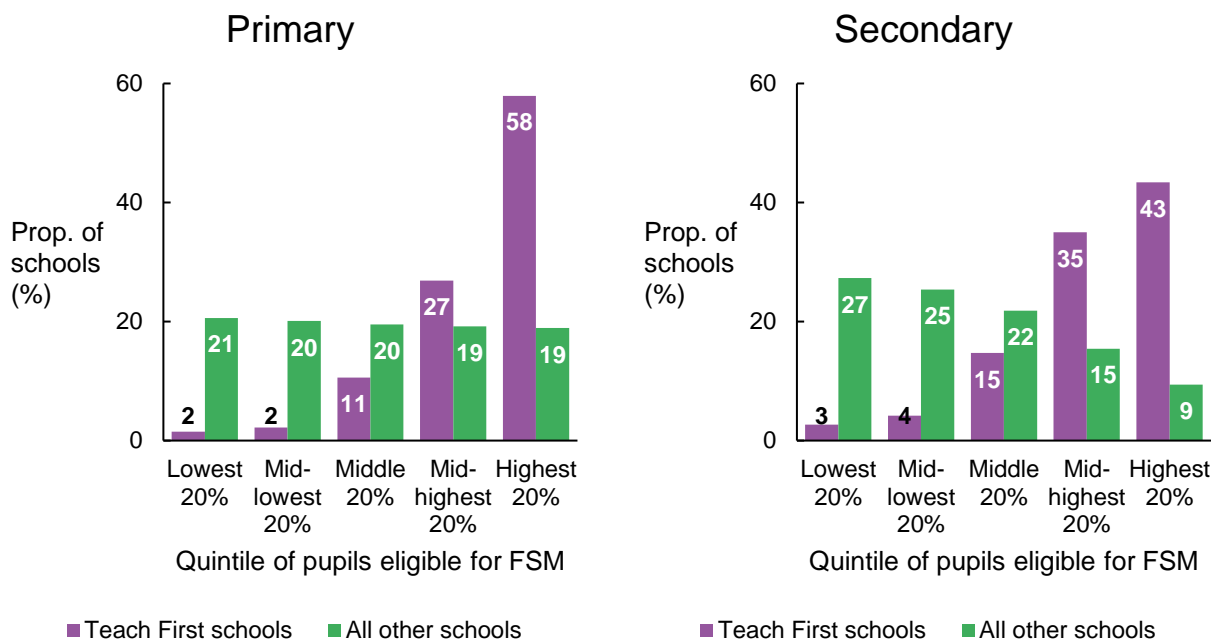
Source: NFER analysis of SWC and Teach First data (for 2012/13 – 2018/19).

Similarly, 42 per cent of Teach First secondary schools were schools in the highest quintile for pupil deprivation, compared to eight per cent of comparison secondary schools. Conversely, three per cent of secondary schools were in the bottom two quintiles for pupil deprivation, compared to 54 per cent of comparison schools.

A similar pattern is evident in pupils eligible for free school meals (FSM). Figure 4 shows that 58 and 43 per cent of primary and secondary Teach First schools, respectively, are schools in the highest quintile for pupils eligible for FSM. This compares to 19 and 9 per cent of comparison primary and secondary schools, respectively.

²² In other words, two-thirds of Teach First primary schools were among the 20 per cent of schools in England with the highest levels of pupil deprivation.

Figure 4 Teach First primary and secondary schools were more likely than comparison schools to be amongst the schools with the highest proportion of pupils eligible for FSM



Note: These figures are based on the proportion of pupils who are eligible for FSM within year. Columns do not exactly sum to 100% as we did not report the small proportion of schools that have missing pupil FSM eligibility data.

Source: NFER analysis of SWC and Teach First data (for 2012/13 – 2018/19).

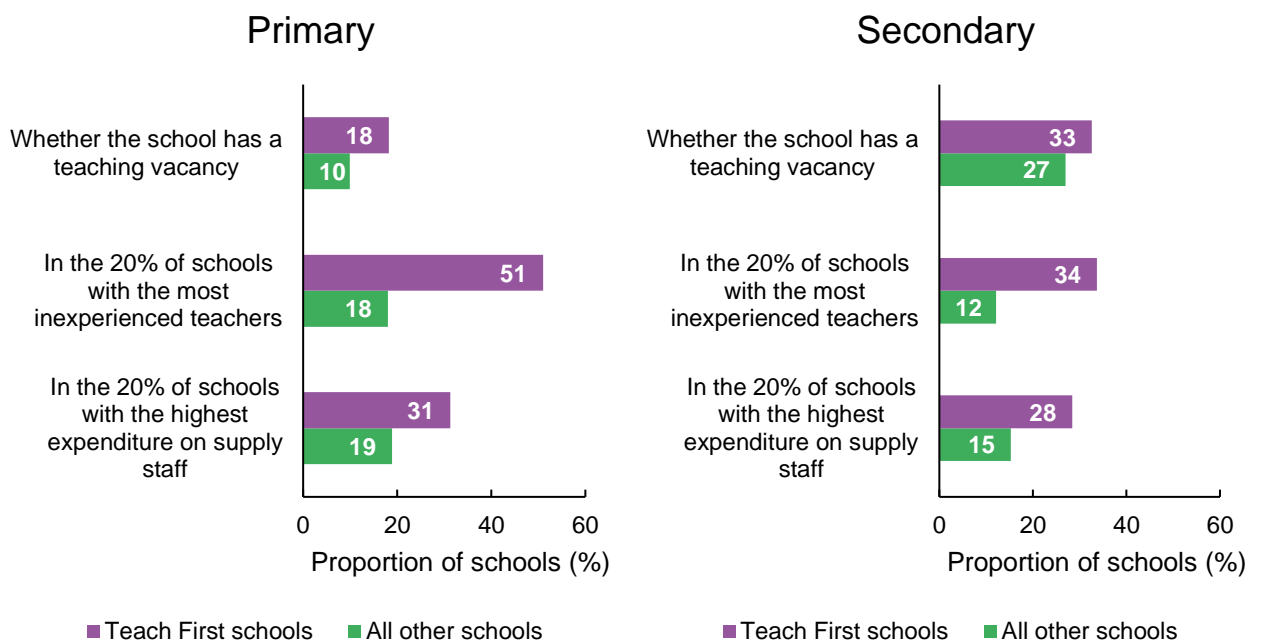
3.3 Differences in workforce characteristics between Teach First and comparison schools

Schools that were eligible for Teach First also tended to face greater challenges maintaining a sufficient workforce than other schools in England. This was apparent across a variety of measures. Figure 5 shows that, in the year that they first recruited a Teach First trainee, the proportion of Teach First primary schools with an unfilled teaching vacancy²³ was nearly double the proportion of comparison primary schools (18 per cent compared to 10 per cent). Similarly, a third of Teach First secondary schools had an unfilled teaching vacancy, compared to 27 per cent of comparison secondary schools. Higher vacancy numbers may signify that Teach First-eligible schools found it difficult to recruit sufficient numbers of teachers.

²³ In the SWC data, we were only able to observe whether schools had open teaching vacancies as of November of that academic year.

Additionally, in the year in which Teach First schools recruited their first Teach First trainee, the proportion of staff that were inexperienced teachers (i.e. had less than two years of teaching experience) was higher than in other schools in England. Specifically, 51 and 34 per cent of Teach First primary and secondary schools, respectively, were schools in the top quintile for the highest proportion of inexperienced teachers on their staff.²⁴ This was nearly triple the proportion of comparison primary and secondary schools. This could be a reflection of teachers moving to less-challenging schools as they gain experience. Teachers in the first few years of their careers are also more likely than more-experienced teachers to leave teaching. This, coupled with teachers leaving for less-challenging schools, may also have helped contribute to higher turnover (and therefore more teaching vacancies) at Teach First schools.

Figure 5 Teach First schools were more likely to have a teaching vacancy than comparison schools and be among the schools with the highest proportion of inexperienced teachers on staff and heaviest reliance on supply staff



Note: Inexperienced teachers were defined as teachers with less than two years of experience.

Source: NFER analysis of SWC and Teach First data (for 2012/13 – 2018/19).

Schools that experience challenges teacher supply (either through challenges with recruitment or other reasons such as high numbers of absences) tend to have a higher reliance on supply staff to fill gaps in their workforce (Worth and Faulkner-Ellis, 2022b). Accordingly, in the year in which they

²⁴ Based on quintiles (i.e. schools which were among the 20 per cent of schools in England with the highest proportion of inexperienced staff).

recruited their first Teach First trainee, 31 and 28 per cent of Teach First primary and secondary schools, respectively, were among the schools in the top quintile for expenditure on supply staff. This compared to 19 and 15 per cent of comparison primary and secondary schools.

Our analysis of Teach First teachers' careers showed that, not only does Teach First provide a supply of teachers to disadvantaged schools, but Teach First teachers were also more likely than teachers who trained through other routes to be qualified in mathematics, sciences and English, subjects which consistently do not meet teacher recruitment targets (McLean and Worth, 2023). Supporting schools which face challenging recruitment circumstances is a key aim of the Teach First Training Programme. Schools which recruit teachers from Teach First may, therefore, be expected to face lower recruitment challenges over time. We discuss the impact of Teach First teacher recruitment on schools' workforce challenges in section 4.

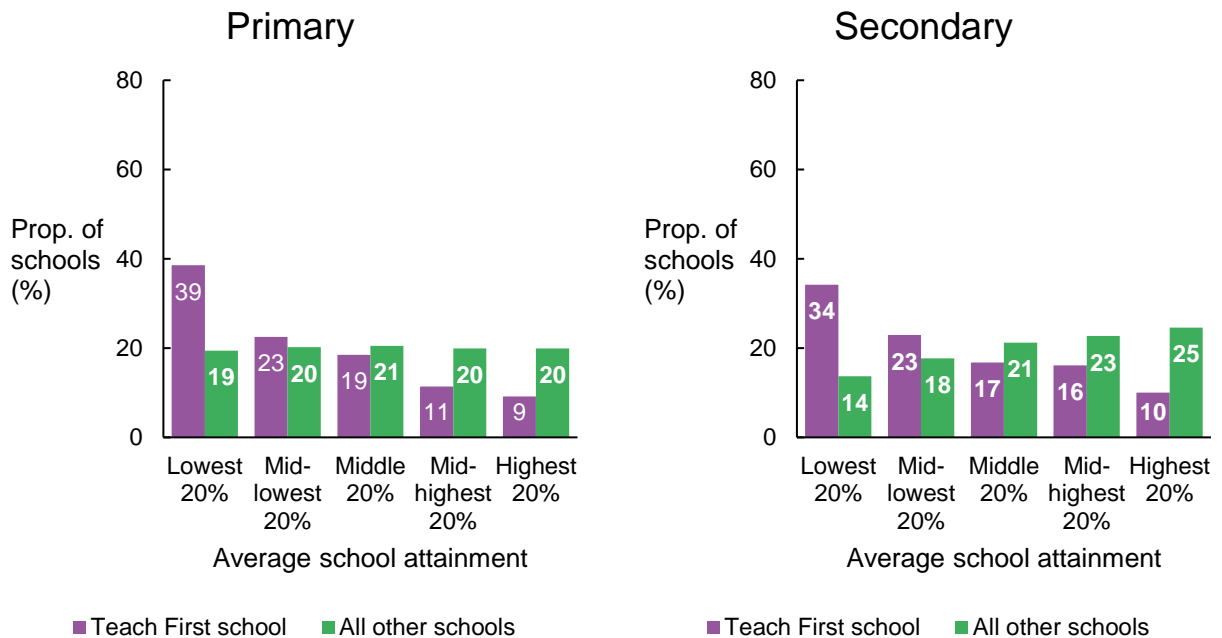
3.4 Differences in pupil outcomes between Teach First and comparison schools

In the year in which Teach First schools recruited their first Teach First trainee, they also tended to have lower average attainment than comparison schools. The gap in attainment is likely to have been driven by numerous, complex factors. However, a significant driver of the gap in attainment was likely due to the general difficulties schools serving disadvantaged communities face in attracting and retaining teachers (Sibieta, 2020). As we noted in section 3.3, high staff turnover and recruitment and retention challenges more broadly lead to higher reliance on inexperienced or non-specialist teachers (for secondary schools) and supply staff to fill gaps in the workforce. Less-experienced, non-specialist and supply staff may have less well-developed teaching skills, which in turn can lead to lower attainment (Worth and Faulkner-Ellis, 2022b).

Figure 6 shows that, in the year they recruited their first trainee, 39 and 34 per cent of Teach First primary and secondary schools, respectively, were among the quintile of schools in England with the lowest average attainment, compared to 19 and 14 per cent of non-Teach First schools. Conversely, about 10 per cent of both Teach First primary and secondary schools were among quintile of schools with the highest attainment. This was about half the proportion of comparison primary schools and 40 per cent of the proportion of comparison secondary schools.

Pupils who attended a Teach First secondary school were also less likely than pupils who attended other secondary schools to ever attend university. This may have been a further consequence of lower average attainment. However, it also likely reflected other realities for pupils from disadvantaged backgrounds more generally, such as lower parental education levels (Strand, 2014) and lower university aspirations (Jerrim *et al.*, 2018).

Figure 6 Teach First schools were more likely than comparison schools to be amongst the quintile of schools with the lowest average attainment



Note: Attainment for primary schools refers to Key Stage 2 average reading and mathematics attainment scores. Attainment for secondary schools refers to total Key Stage 4 average point score, or average attainment 8 score (depending on the year).

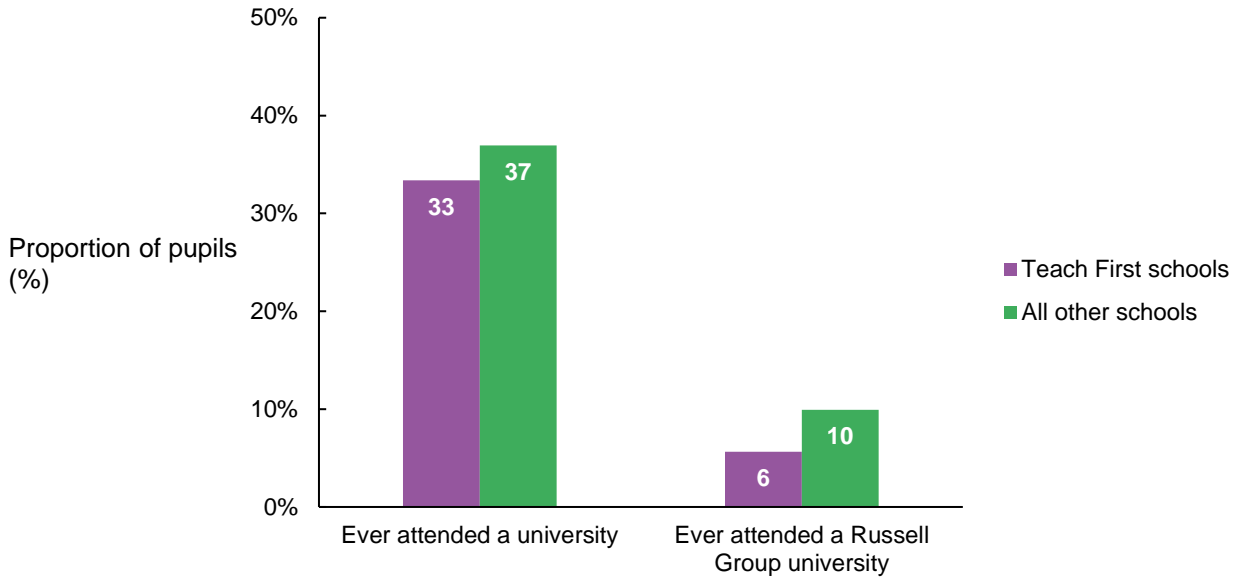
Source: NFER analysis of SWC and Teach First data (for 2012/13 – 2018/19).

Figure 7 shows that for pupils who sat their GCSEs at a Teach First school in the year it became a Teach First school, 33 per cent went on to attend a university, and six per cent went on to attend a Russell Group university.²⁵ This was lower than the 37 per cent and 10 per cent of pupils in all other schools who went on to attend a university and a Russell Group university, respectively.

We showed in our analysis of Teach First teachers’ career progressions that, due to its eligibility criteria, teachers recruited to train through Teach First had a different academic and motivational profile than teachers who trained through other routes (McLean and Worth, 2023). Specifically, Teach First teachers were much more likely than other teachers to have a first-class or upper second-class undergraduate degree and demonstrated competencies such as leadership, humility and motivation. These factors may have led to Teach First teachers acting as role models for pupils, and therefore have a direct impact on pupil outcomes.

²⁵ The list of Russell Group universities can be found at: <https://russellgroup.ac.uk/about/our-universities/>

Figure 7 The proportion of pupils in Teach First schools who attended a university and a Russell Group university was lower than for other schools



Source: NFER analysis of HESA (for 2012/13 – 2020/21) and Teach First (for 2012/13 – 2018/19) data.

Recruitment from Teach First may also help to reduce teacher supply challenges for schools, enabling them to re-direct resources to supporting pupil outcomes. These factors may lead to direct impacts on pupil attainment and higher post-16 progression into university. We show how schools' recruitment of Teach First teachers impacts GCSE attainment and university attendance in section 5.

4 The impact of recruiting a Teach First trainee on a school's workforce

We showed in section 3 that Teach First schools (i.e. schools which partner with Teach First to employ a trainee on the Training Programme) were distinct from comparison schools in several key ways. In particular, we showed that, prior to recruiting their first Teach First trainee, Teach First schools were more likely than comparison schools to face challenges with recruiting and retaining teachers, leading to schools' higher use of supply staff and relatively inexperienced teachers in their workforces.

Teach First schools may therefore have recruited trainees from Teach First in part to address some of the workforce challenges they faced. In this section, we show how many Teach First and non-Teach First trainees schools tended to recruit before and after their first Teach First trainee. This is to determine what the alternative to Teach First might have been for schools; that is, whether recruitment from Teach First tended to displace teachers trained through other routes.

We then examine more broadly whether schools' recruitment of Teach First trainees had any impacts on their teacher supply challenges, compared to otherwise similar schools. We analyse whether becoming a Teach First school led to differences in schools' use on supply teachers and the number of vacancies (separately for primary and secondary schools). This section reports results from our statistical modelling of workforce outcomes for Teach First schools compared to similar comparison schools. Section 2 provides further details on the statistical matching and regression modelling.

4.1 The number of Teach First trainees recruited to schools

On average, schools that recruited their first Teach First trainee between 2012/13 and 2018/19 employed 1.5 trainees in the year they became a Teach First school. However, this differed significantly by phase, as primary schools took on, on average, one Teach First trainee in their first Teach First year on average, while secondary schools took on about two, on average. This difference is not unexpected since secondary schools tend to recruit more trainees, from all routes, each year than primary schools, due to secondary schools' larger workforces and greater recruitment needs.

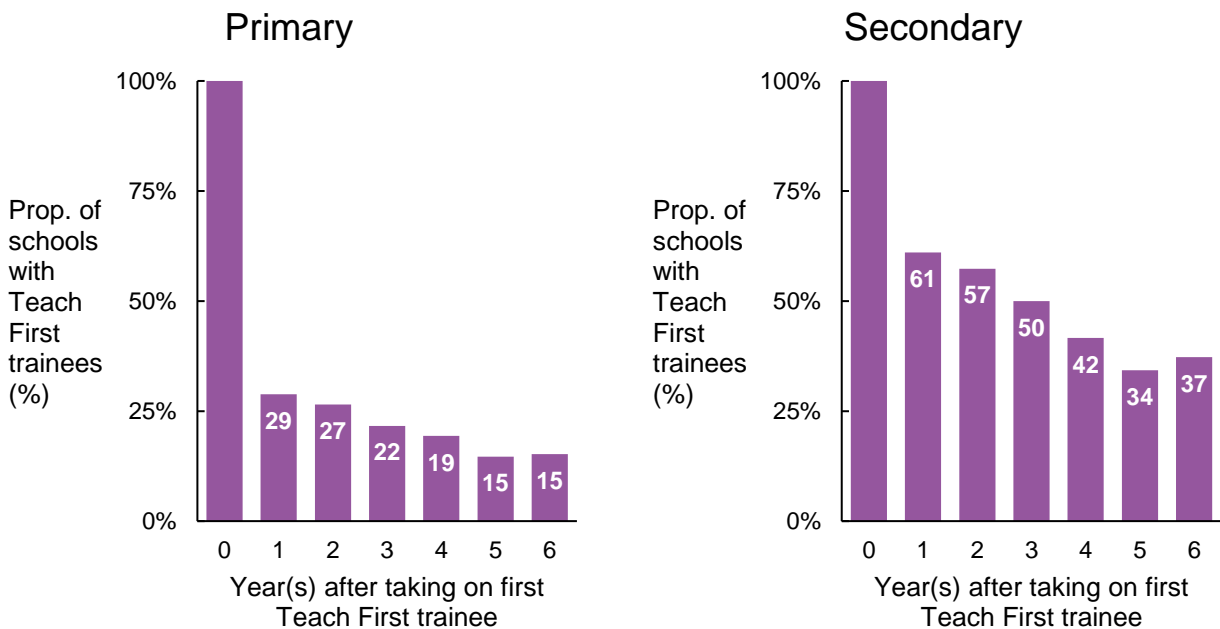
A considerable proportion of schools also continued to recruit Teach First trainees in the years after their first trainee, an indicator that many schools likely viewed recruitment from Teach First as providing value to the school. There were significant differences by phase – secondary schools were much more likely than primary schools to recruit additional Teach First trainees in the years after their first.

Figure 8 shows that 29 per cent of primary schools took on an additional Teach First trainee in the year after taking on their first. In the sixth year after their first trainee, 15 per cent of Teach First primary schools took on an additional trainee. For secondary schools, 61 per cent took on an additional trainee in the year after their first trainee, more than double the proportion of primary schools. Similarly, in the sixth year after their first trainee, 37 per cent of Teach First secondary

schools took on an additional trainee, which was also more than double the proportion of primary schools.

This likely reflects, in part, secondary schools’ larger workforces and greater need for new teacher recruits. Furthermore, Teach First secondary teachers were more likely than similar secondary teachers trained through other routes to be qualified in shortage subjects such as English and mathematics (McLean and Worth, 2023). Secondary schools may, therefore, have been more likely than primary schools to ‘partner’ with Teach First in order to help with subject-specific teacher vacancies that otherwise may have been difficult to fill.

Figure 8 Secondary schools were much more likely than primary schools to recruit additional Teach First trainees in the years after their first trainee



Source: NFER analysis of SWC and Teach First data (for 2012/13 – 2018/19).

4.2 The impact of becoming a Teach First school on the number of trainees and NQTs from other routes

We then estimated how the number of trainees and NQTs from other non-Teach First training routes (higher education and school- and employment-based routes) that Teach First schools recruited after becoming a Teach First school compared to similar comparison schools. This was to determine whether Teach First teachers tended to displace teachers trained through other routes.

The analysis was based on the matched sample. This is because, as we showed in section 3, Teach First schools had unique characteristics and faced different retention and recruitment situations than comparison schools. Therefore, using the matched sample enables a like-for-like

comparison of Teach First and comparison schools. Section 2 provides further details on the statistical matching.

Figure 9 shows that Teach First schools tended to recruit more trainees and NQTs from non-Teach First training routes than similar comparison schools in the years after they recruited their first Teach First trainee.²⁶ Primary schools tended to recruit about a tenth of an additional teacher more than similar comparison schools for each year after their first Teach First trainee. This is a relatively small difference, roughly equivalent to one additional non-Teach First teacher every ten years more than similar comparison schools. While small, the difference was roughly constant from for each of the six years after a school recruited their first Teach First trainee, and statistically significant in most years.

Figure 9 After recruiting their first Teach First trainee, Teach First schools recruit more trainees and NQTs from non-Teach First training routes than similar comparison schools



Note: Reference year refers to the year in which a Teach First school recruited its first Teach First trainee, and the year in which a comparison school was matched to a Teach First school. Section 2 details the statistical matching. Estimates were not statistically significant where the confidence interval crossed the horizontal axis.

Source: NFER analysis of SWC (for 2010/11 – 2018/19) and Teach First (for 2012/13 – 2018/19) data.

²⁶ The difference in the number of non-Teach First trainees recruited in the years before the reference year between Teach First and comparison schools was not statistically significant. This means that, post-reference year, the difference in the number of non-Teach First trainees recruited was unlikely to reflect pre-existing trends which were not balanced by the statistical matching. See the appendix for a discussion of pre-trends in the difference-in-differences regression models.

Overall, the results indicate that, for primary schools, Teach First trainees did not tend to displace new trainees from other routes when they arrived in a Teach First school. In fact, recruitment from Teach First tended to complement recruitment from other routes up to six years after a school's first Teach First trainee. This may suggest that primary schools viewed Teach First as a part of their wider strategies to recruit teachers.

Similarly to primary schools, Teach First trainees also did not tend to displace new trainees from other routes in secondary schools. In the two years after taking on a Teach First teacher for the first time, there was no statistically significant difference in the number of non-Teach First trainees and NQTs recruited between Teach First and comparison schools. This suggests that secondary schools were recruiting similar numbers of trainees from non-Teach First training routes to other similar schools and that Teach First may have been used to supplement their typical recruitment.

From three years after taking on their first Teach First trainee, Teach First secondary schools tended to recruit more trainees and NQTs from non-Teach First training routes than similar comparison schools. This aligns with Figure 8, which showed that the proportion of schools recruiting additional Teach First trainees began to fall about three years after their first.

Specifically, three years after recruiting their first Teach First trainee, Teach First schools on average recruited one tenth of a non-Teach First teacher per year more than comparison schools. This difference grew to about a quarter of a trainee per year (and was statistically significant) five years after their first Teach First trainee. This is equivalent to about one non-Teach First teacher every ten years and every four years more than similar comparison schools, three and five years after their first Teach First trainee, respectively.

Figures 8 and 9 together therefore suggest that Teach First secondary schools tended to supplement their typical recruitment with Teach First teachers for about three years after employing their first Teach First trainee. Four to six years later, Teach First schools recruited more teachers than similar comparison schools, but new recruits were more likely to be from non-Teach First routes.

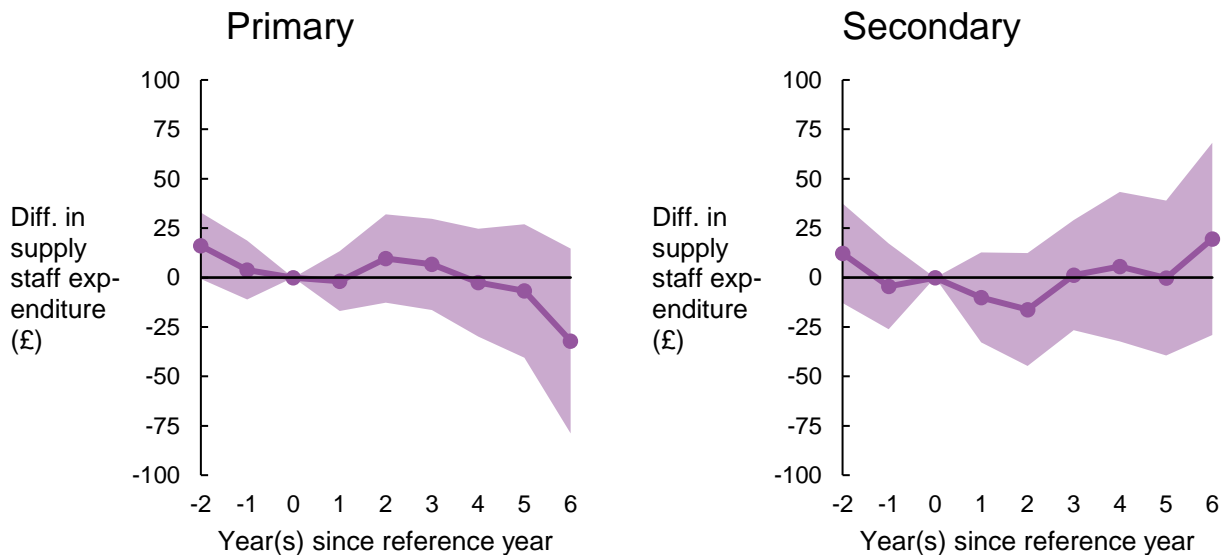
4.3 Impacts on other workforce characteristics

We also analysed the impact of becoming a Teach First school on a school's supply staff expenditure, turnover rates, number of unfilled vacancies and number of temporarily-filled positions at the school, compared to similar comparison schools. These are all characteristics reflecting schools' workforce challenges, which we showed in section 3 differ substantially between Teach First and unmatched comparison schools. Reducing schools' workforce challenges is also a key aim for Teach First, and part of its overall objective of reducing gaps in pupil attainment.

Figure 10 shows that, for primary schools, there was no statistically significant difference in school expenditure on supply staff in any year after a school recruited its first Teach First trainee. This is not necessarily surprising since, as we showed in section 4.1, the average primary school takes one Teach First trainee and the majority of schools do not take further trainees in subsequent years.

In section 4.1, we showed that secondary schools recruited more Teach First trainees than primary schools, and more than half took on additional Teach First trainees after their first. We may therefore expect secondary schools to have experienced more significant impacts on supply staff expenditure. Indeed, Figure 10 shows that Teach First secondary schools on average had lower expenditure on supply staff than similar comparison schools in the first two years after taking on their first Teach First trainee. However, the effect was small and not statistically significant (£10 and £16 per pupil per year, one and two years after a school’s first Teach First trainee, respectively).

Figure 10 There were no statistically significant differences in supply staff expenditure between Teach First and similar comparison schools



Note: We analysed expenditure on supply staff on a per-pupil basis to compare schools of different sizes on a like-for-like basis. Reference year refers to the year in which a Teach First school recruited its first Teach First trainee, and the year in which a comparison school was matched to a Teach First school. Section 2 details the statistical matching. Estimates were not statistically significant where the confidence interval crossed the horizontal axis.

Source: NFER analysis of SWC (for 2010/11 – 2018/19) and Teach First (for 2012/13 – 2018/19) data.

There were also no statistically significant differences in turnover rates, the number of unfilled vacancies or the number of temporarily-filled posts for either Teach First primary or secondary schools compared to similar primary and secondary comparison schools.

This is not to suggest that Teach First teachers had no impact on teacher supply in Teach First schools. Our measures of per-pupil supply staff expenditure, turnover rates, and vacancies were subject to a degree of statistical noise, which may have masked any small improvements in these measures associated with recruiting Teach First teachers. The workforce measures we included in

the analysis were also only a limited set of proxies for workforce challenges more widely, which may not necessarily have offered a complete picture of workforce impacts.

Moreover, our findings on the careers of Teach First teachers (McLean and Worth, 2023) found that their career paths tended to be very different from similar teachers who trained through other routes. Specifically, Teach First teachers' who stayed in teaching were more likely than similar teachers working in similar schools to leave their placement school. However, they were more likely than similar teachers working in similar schools in their training year to stay working within a school serving disadvantaged pupils after moving schools. A Teach First teacher's impact on recruitment and retention challenges in disadvantaged schools may therefore have been spread amongst other disadvantaged schools beyond the one in which they were originally placed for their training.

Teach First teachers who stayed in teaching also moved into middle and senior leadership positions much more quickly than otherwise similar teachers who trained through other routes (McLean and Worth, 2023). Teachers being promoted quickly to higher leadership positions may lead to teaching vacancies at the school to replace their teaching positions, therefore leading to minimal impacts on teacher supply in their original placement school. Nonetheless, Teach First teachers who move to leadership roles may be more likely to have the opportunity to have a broader impact on schools' recruitment challenges. Specifically, faster progression into leadership roles may enable Teach First teachers to influence staffing from a managerial role earlier in their careers than other, similar teachers who trained through other routes.

5 The impact of Teach First teacher recruitment on pupil outcomes

We showed in section 3 that, prior to recruiting their first Teach First trainee, Teach First schools (i.e. schools which partner with Teach First to employ a trainee on the Training Programme) were more likely than comparison schools to face teacher recruitment and retention challenges, and therefore recruited Teach First trainees to help supplement their existing teacher recruitment. In section 4, we found that schools tended to recruit Teach First trainees to supplement their existing recruitment strategies, but that this had a minimal effect on a number of measures of schools' workforce challenges.

In this section, we analyse what effect partnering with Teach First has on pupil outcomes. We consider the direct impact on GCSE, A level and Key Stage 2 attainment, in addition to the proportion of pupils who ever attend university and a Russell Group university.

We consider first the direct impact on GCSE attainment within the departments in secondary schools which recruited Teach First teachers. We also analyse the impact at the whole-school level to determine whether any impacts are focussed in Teach First departments or whether they spread throughout Teach First schools more widely.

5.1 The effect of Teach First trainee recruitment on GCSE attainment

In this section, we show whether becoming a Teach First school was associated with differences in the GCSE attainment of pupils compared to similar comparison schools. We conducted our analysis of GCSE impacts primarily at the department level.²⁷ This is because secondary school departments are a smaller unit of analysis than the whole school, so the analysis is much more likely to reflect the direct impact of the teacher on attainment.

Our analysis was based on a regression model of standardised capped GCSE attainment scores for pupils who sat their GCSE exams between 2009/10 and 2018/19. We compared GCSE attainment in Teach First and similar comparison departments before and after the year the department became a Teach First department. See section 2 and the methodology appendix for more details on variable definitions and model specifications.

Figure 11 shows the results of the triple-difference model estimation for all pupils (in the left pane) and for FSM-eligible pupils only²⁸ (in the right pane). We found that the recruitment of a Teach First trainee was associated with higher GCSE attainment in the departments in which the trainee was placed, compared to otherwise similar departments without a Teach First trainee. The difference was small but statistically significant for all pupils two to four years after a school recruited its first Teach First trainee. The difference subsequently to this was not statistically significant. Specifically,

²⁷ A department which did not recruit any Teach First teachers would be considered a non-Teach First department even if there were other departments in the school which did recruit a Teach First teacher. See section 2 for more details on the Teach First department definition.

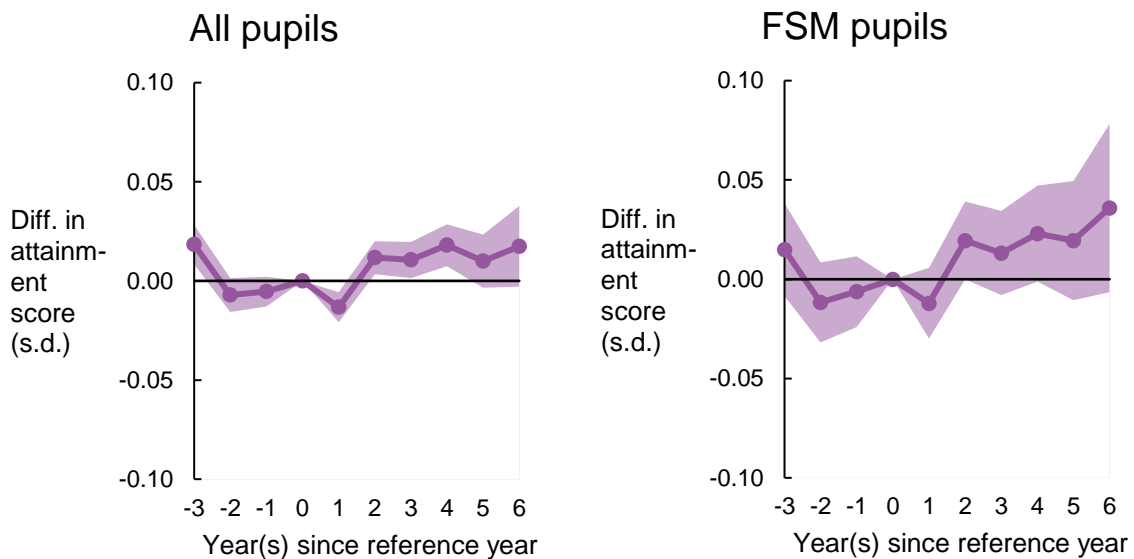
²⁸ Our analysis is based on pupils who were eligible for FSM within the year they sat their GCSE exams.

recruiting a Teach First trainee to a department was associated with attainment that was about 0.01 standard deviations higher two years later than similar comparison departments over the same period. We observed a similar pattern for FSM-eligible pupils, but the difference was not statistically significant.²⁹

Importantly, we observed statistically significant differences in the trend in department-level GCSE attainment in the years prior to a department recruiting its first Teach First trainee. Specifically, GCSE attainment in Teach First departments tended to be falling (to a greater extent than in similar comparison departments) in the three years prior to a department becoming involved with Teach First. This may help to explain why the impact on GCSE attainment one year after recruiting their first Teach First trainee was statistically significantly negative.

Our analysis of SWC data on the year groups each teacher taught found that the vast majority (96 per cent) of Teach First teachers were teaching at least Year 10 and/or 11, among other year groups, in their NQT year. It would therefore be reasonable to expect that we would only be able to observe the direct impact on GCSE attainment two years after a school became a Teach First school.

Figure 11 Becoming a Teach First school was associated with slightly higher GCSE attainment in departments in which the trainee was placed, compared to otherwise similar departments without a Teach First trainee



Source: NFER analysis of NPD (for 2009/10 – 2018/19) and Teach First (for 2012/13 – 2018/19) data.

²⁹ The estimate for FSM-eligible pupils is likely insignificant while the overall estimate is significant because the sample size of FSM-eligible pupils is much smaller.

The existence of this statistically significant ‘pre-existing trend’ was likely in part a reflection of the statistical matching we implemented prior to the regression modelling. As we noted in section 2, we matched Teach First schools to comparison schools based on school characteristics, not department characteristics. There may, therefore, be differences in other key characteristics (e.g. size of the department, whether there were teacher vacancies in that department, etc.) which may have influenced both the likelihood of recruiting a Teach First trainee and also GCSE attainment in that department.

This pre-existing trend may suggest that our estimates of the impact on GCSE attainment were somewhat understated, and the ‘true’ impact may have been larger than what we showed in Figure 11. Equally, it could be argued that there is an overall linear positive trend, with years -3 and 1 as anomalies, thus suggesting no impact on attainment. However, our analysis plan was clear on taking the three prior years to establish a pre-trend. Our estimates should therefore be taken as suggestive of a positive impact on GCSE attainment in Teach First departments compared to similar comparison departments, rather than a precise estimate.

5.2 The effect of Teach First trainee recruitment on whole-school GCSE attainment

The impact of Teach First teacher recruitment on GCSE attainment was likely driven by two factors: the direct impact of the teacher on pupils and other, wider improvements to the school which may be associated with engagement with the Teach First Training Programme. In this section therefore, we extend the department-level analysis to explore whether becoming a Teach First school is associated with any whole school-level impacts on GCSE attainment. This analysis is similar to our workforce analysis in section 4 and compares overall GCSE trends in Teach First schools with similar comparison schools.

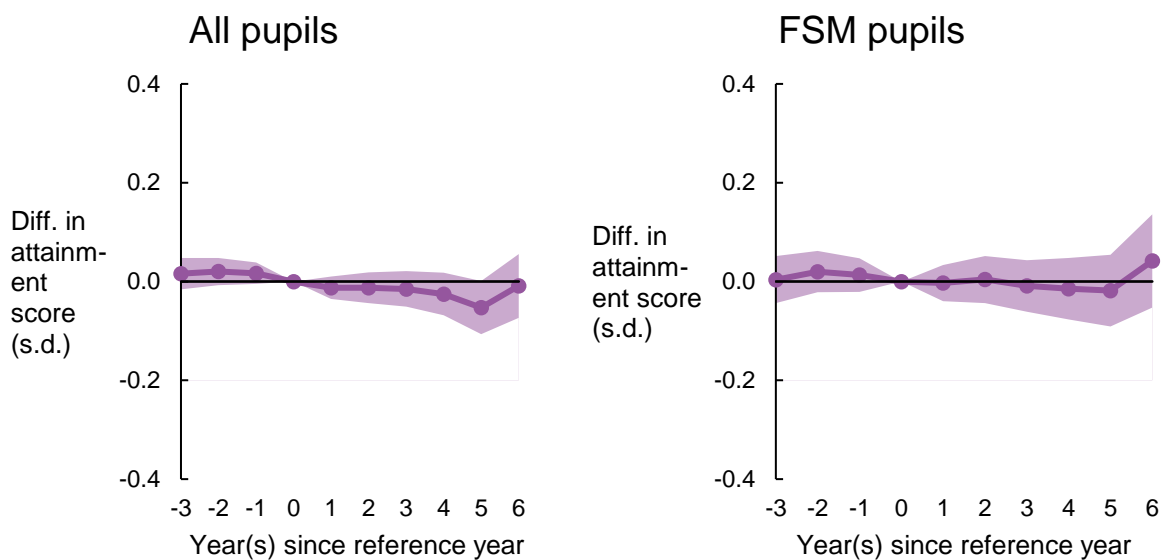
Our estimates reflected the average overall effect of a secondary school becoming a Teach First school on whole-school GCSE attainment. The analysis therefore included the GCSE attainment of all pupils in Teach First schools, including those who may not have been directly taught by a Teach First teacher. This was in order to assess whether the impact of Teach First teachers on GCSE attainment was focussed primarily in a teachers subject area, or whether impact there was a wider impact throughout Teach First schools.

Figure 12 shows our estimates for all pupils and for FSM-eligible pupils. Our results show that, at the whole-school level, there were no statistically significant differences in GCSE attainment associated with becoming a Teach First school, for either all pupils or for FSM-eligible pupils. In terms of whole-school attainment Teach First schools tended to have similar GCSE attainment to otherwise similar comparison schools.

The results therefore suggest that the attainment impact of recruiting Teach First trainees to a school tended to be limited to within the departments in which they taught, and were unlikely to extend more broadly within the school. This is not necessarily surprising given that a key mechanism for whole-school improvements in attainment would be Teach First’s impact on reducing workforce challenges in schools, which in section 4 we found to be minimal.

We also explored whether there were differences in the impact on GCSE attainment over time and between different regions in England. However, our analysis showed that there were no statistically significant differences across either of these characteristics.

Figure 12 There were no statistically significant differences in whole-school GCSE attainment associated with becoming a Teach First school



Note: Reference year refers to the year in which a Teach First school recruited its first Teach First trainee, and the year in which a comparison school was matched to a Teach First school. Section 2 details the statistical matching. Estimates were not statistically significant where the confidence interval crossed the horizontal axis.

Source: NFER analysis of NPD (for 2009/10 – 2018/19) and Teach First (for 2012/13 – 2018/19) data.

There were also no statistically significant differences in impact between schools that had high and low engagement with Teach First. Specifically, there was no difference in the impact on GCSE attainment between schools that took on one trainee compared to schools that took on two or more trainees. Similarly, there were no significant differences between schools that engaged in one or more Teach First programmes (one or more of Career Leaders, NPQs or Leading Together) in addition to the training programme.

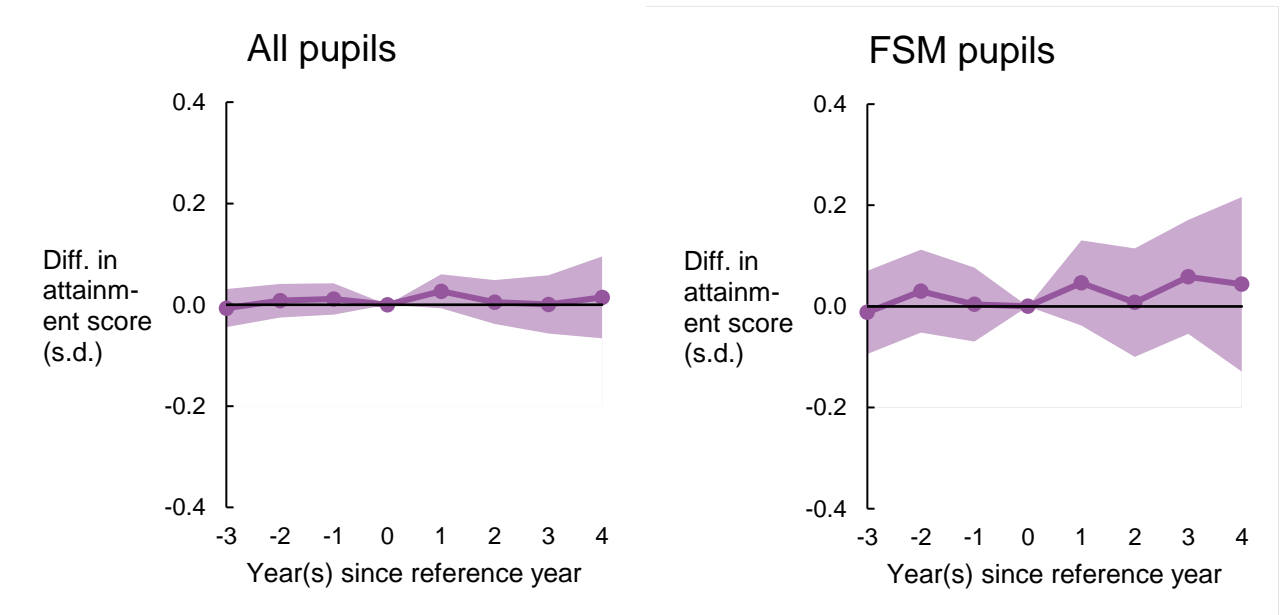
5.3 The effect of Teach First teacher recruitment on A level attainment

We also analysed whether a school recruiting Teach First trainees had an impact on pupils' A level attainment, to assess whether Teach First was associated with differences in attainment after a pupil entered post-16 education. We compared the A level attainment for pupils who sat their GCSE exams at a Teach First school between 2012/13 and 2016/17 with pupils who sat their

GCSE exams at a similar comparison school.³⁰ To ensure we compared A level attainment on a like-for-like basis between pupils who sat different numbers of A level examinations, we analysed the average points per A level entry³¹ and we standardised average points per entry within year. See section 2 for more details on variable definitions and model specifications.

Most pupils complete their A level qualifications two years after completing their GCSEs and we tracked the same cohorts of pupils as for our analysis of GCSE attainment. We therefore estimated the effect of recruiting a Teach First trainee on A level attainment for up to four years after a secondary school became a Teach First school.

Figure 13 There was no statistically significant difference in A level attainment for pupils who sat their GCSEs in Teach First schools compared to pupils who sat their GCSEs in similar comparison schools



Note: Reference year refers to the year in which a Teach First school recruited its first Teach First trainee, and the year in which a comparison school was matched to a Teach First school. Section 2 details the statistical matching. Estimates were not statistically significant where the confidence interval crossed the horizontal axis.

Source: NFER analysis of NPD (for 2009/10 – 2018/19) and Teach First (for 2012/13 – 2018/19) data.

³⁰ An alternative approach would have been to analyse A level attainment for pupils who sat their A levels at Teach First schools between 2012/13 and 2018/19. However, this would restrict our analysis only to those Teach First schools with sixth form colleges. Since few Teach First schools had sixth form colleges, this significantly reduced the sample size of schools available for the analysis and threatened the validity of the statistical matching.

³¹ This is how DfE presents its public A level attainment statistics. See <https://explore-education-statistics.service.gov.uk/find-statistics/a-level-and-other-16-to-18-results>.

Figure 13 shows that there was no statistically significant difference in A level attainment for pupils who sat their GCSEs in Teach First schools compared to pupils who sat their GCSEs in similar comparison schools. This was true for all pupils and also for pupils who were FSM-eligible. This may have been, in part, because our findings in Figure 13 reflected the impact on A level attainment in many cases after pupils left the Teach First schools in which they sat their GCSEs. Since there were few Teach First schools which had sixth forms, a minority of Teach First teachers would have been able to directly impact their pupils' A level attainment.

We also explored whether there were differences in the impact of Teach First on A level attainment over time and between different regions in England. However, our analysis showed that there were no statistically significant differences across either of these characteristics.

There were also no differences in the impact on A level attainment between schools that took on one Teach First trainee compared to schools that took on more than one trainee. Similarly, there were no significant differences between schools that engaged in one or more Teach First programme in addition to the training programme.

5.4 The impact of becoming a Teach First school on the proportion of pupils who attended university

As we showed in section 3, before recruiting a Teach First trainee, the proportion of pupils who sat their GCSEs in a Teach First secondary school and who ever attended university or Russell Group university was substantially lower than in other schools. Given that we found that there was suggestive evidence that recruiting a Teach First teacher is associated with a small improvement in GCSE attainment, we also analysed whether this was likely to have led to a difference in the proportion of pupils who attended university.

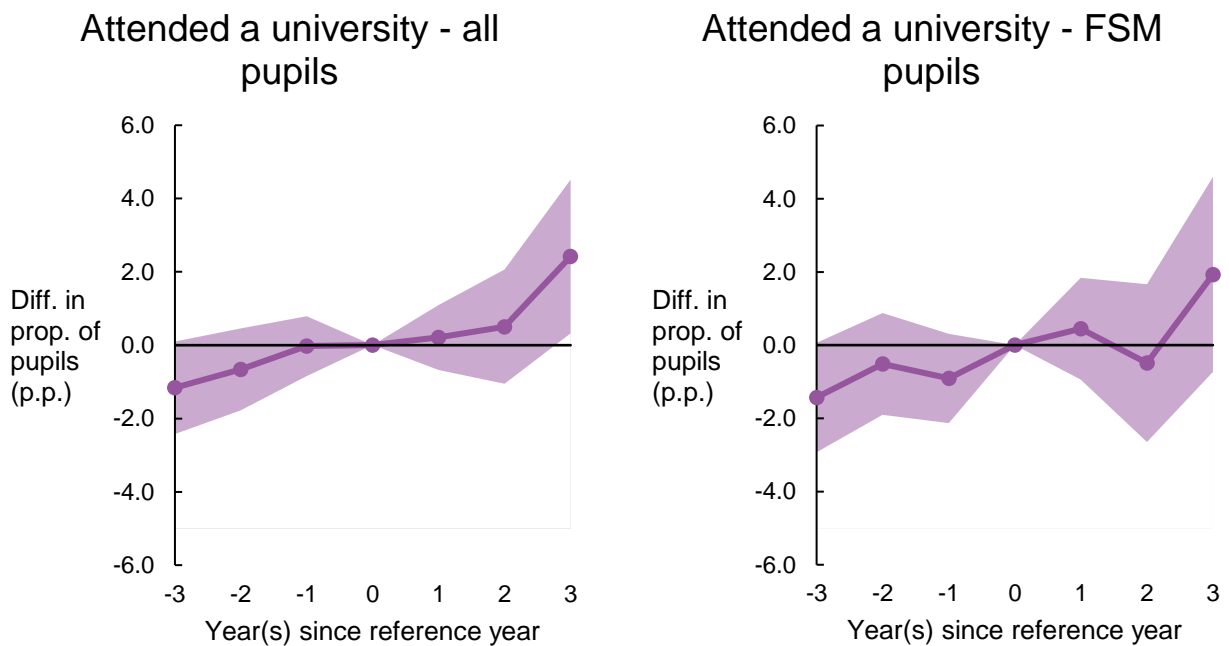
As with our analysis of the impact on A level attainment, this analysis was based on comparing the proportion of pupils who ever attended university between those who sat their GCSEs in a Teach First school and pupils who sat their GCSEs in similar comparison schools. Most pupils who ever attend university do so three years after they sit their GCSEs. Since we tracked the same cohorts of pupils as for our analysis of GCSE and A level attainment, we were only able to analyse the impact on university outcomes for up to three years after a school recruited its first Teach First trainee.

5.4.1 Impact on university attendance

Figure 14 shows that becoming a Teach First school was associated with an increase in the proportion of pupils who ever attended university, compared to similar comparison schools. The estimated impact was largest three years after a school became a Teach First school, where the proportion of pupils who ever attended university had increased by a statistically significant 2.5

percentage points more than similar comparison schools over the same period. We estimated a similar impact for pupils that were eligible for FSM, but it was not statistically significant.³²

Figure 14 The baseline model shows that the proportion of pupils who attended university was slightly higher for pupils who sat their GCSEs in Teach First schools than who sat their GCSEs in similar comparison schools



Note: Reference year refers to the year in which a Teach First school recruited its first Teach First trainee, and the year in which a comparison school was matched to a Teach First school. Section 2 details the statistical matching. Estimates were not statistically significant where the confidence interval crossed the horizontal axis.

Source: NFER analysis of HESA (for 2009/10 – 2020/21) and Teach First (for 2012/13 – 2018/19) data.

This is a substantial difference – our results suggest that, three years after becoming a Teach First school, the initial difference in university attendance rates between Teach First and similar comparison schools had shrunk by more than half. Indeed, the magnitude of the estimated impact may be questionable given that we found there was no statistically significant whole-school impact on GCSE or A level attainment associated with recruiting a Teach First teacher. Furthermore, we may reasonably expect that any direct impact that Teach First teachers may have on their pupils to fade over time. Therefore, the relatively large impact we showed in Figure 14 is even more implausible since university attendance typically occurs several years after pupils sit their GCSEs.

³² Smaller sample sizes of pupils eligible for FSM means that the model's statistical power is lower than for the sample of all pupils.

It is possible that our estimated impact was driven in part by the statistical matching. First, as Figure 14 showed, the difference in the proportion of pupils who attended university between Teach First and similar comparison schools was shrinking in the three years prior to schools becoming a Teach First school. This meant that the proportion of pupils in Teach First schools who ever attended university had been increasing over time faster than similar comparison schools, even before they became a Teach First school. Our estimates may therefore have attributed part of this ‘pre-existing trend’ to the effect of schools becoming a Teach First school (see the methodological appendix for more details on pre-trends in the regression models). While the pre-existing trends were not statistically significant, it does suggest that our estimates may have been somewhat overstated.

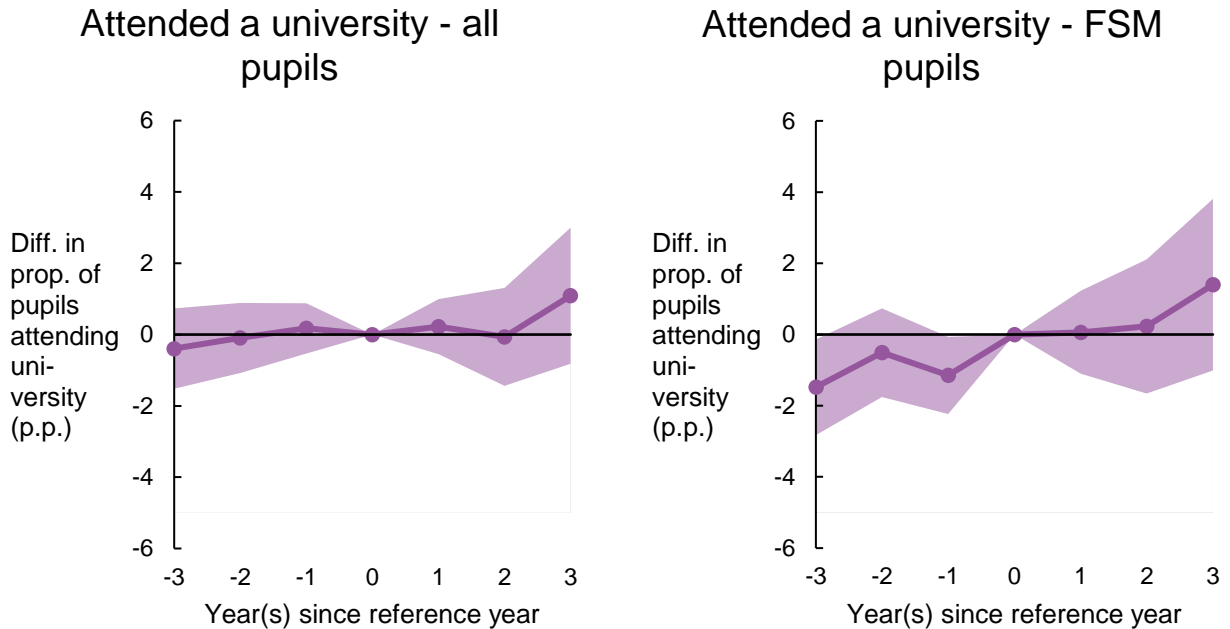
The pre-existing trend may be due to differences between Teach First and similar comparison schools in other factors associated with university attendance, but which we were not able to account for in the statistical matching or the regression modelling (e.g. parental higher education attendance, financial barriers, etc.). In the methodological appendix, we show that the statistical matching for secondary schools led to a bit more imbalance in key characteristics in the matched sample than for primary schools. In addition to the baseline models, we therefore estimated a separate version of the model which used a different statistical matching technique in order to ensure that the statistical matching was not a key driver of the results (see the methodological appendix).³³

Results from this alternative specification (shown in Figure 15) showed that there were no statistically significant differences in university attendance rates between Teach First and similar comparison schools, both for all pupils and FSM-eligible pupils.³⁴ This suggests therefore that the positive impact on university attendance rates shown in Figure 14 may have been driven in part by the statistical matching. Considerable caution should therefore be exercised in interpreting the results in Figure 14 as reflective of the genuine impact of recruiting a Teach First trainee.

³³ The alternative matching technique (entropy balancing) led to better balance in the matched sample. However, we used the Mahalanobis weights for our main estimates throughout the analysis to maintain consistency with our analysis of Teach First teachers’ careers and the existing literature.

³⁴ We checked whether our statistical matching was a key driver of the results for all of our other models, but the impact on university attendance outcomes were the only estimates which were qualitatively different depending on the choice of matching weight.

Figure 15 The findings were highly dependent on the statistical matching – there were no statistically significant difference in university attendance rates between Teach First and similar comparison schools using a different matching technique



Note: These estimates use a different set of matching weights than the estimates shown in Figure 14. Reference year refers to the year in which a Teach First school recruited its first Teach First trainee, and the year in which a comparison school was matched to a Teach First school. Section 2 details the statistical matching. Estimates were not statistically significant where the confidence interval crossed the horizontal axis.

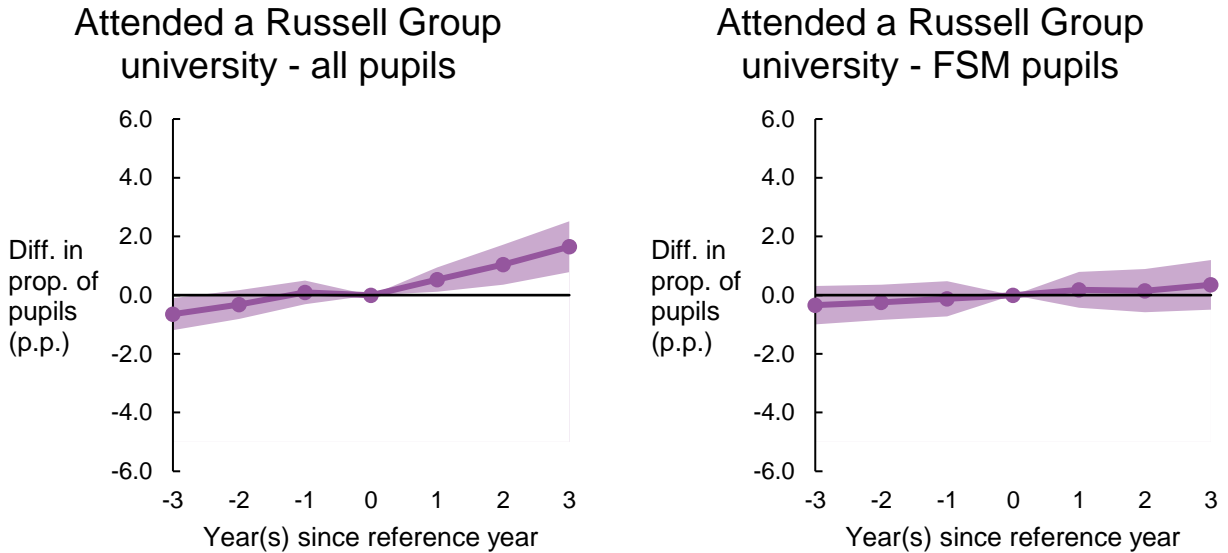
Source: NFER analysis of HESA (for 2009/10 – 2020/21) and Teach First (for 2012/13 – 2018/19) data.

5.4.2 Impact on attending a Russell Group university

Similarly, we estimated separately whether becoming a Teach First school was associated with an increase in the proportion of pupils who ever attended a Russell Group university. As with our baseline overall university attendance findings, Figure 16 shows that becoming a Teach First school was associated with a slight increase in the proportion of their pupils who ever attended a Russell Group university, but this difference was not significant for FSM-eligible pupils.

The magnitude of this estimated effect was relatively large, like with our estimated impact on pupils who ever went on to attend university. However, the same significant caveats apply. The proportion of pupils in Teach First schools who attended Russell Group universities was increasing over time even before the school became a Teach First school. This was evident from Figure 16, where the difference three years prior to becoming a Teach First school was statistically significant and shrank over time.

Figure 16 The baseline model shows that the proportion of pupils who attended a Russell Group university was slightly higher for pupils who sat their GCSEs in Teach First schools than in similar comparison schools

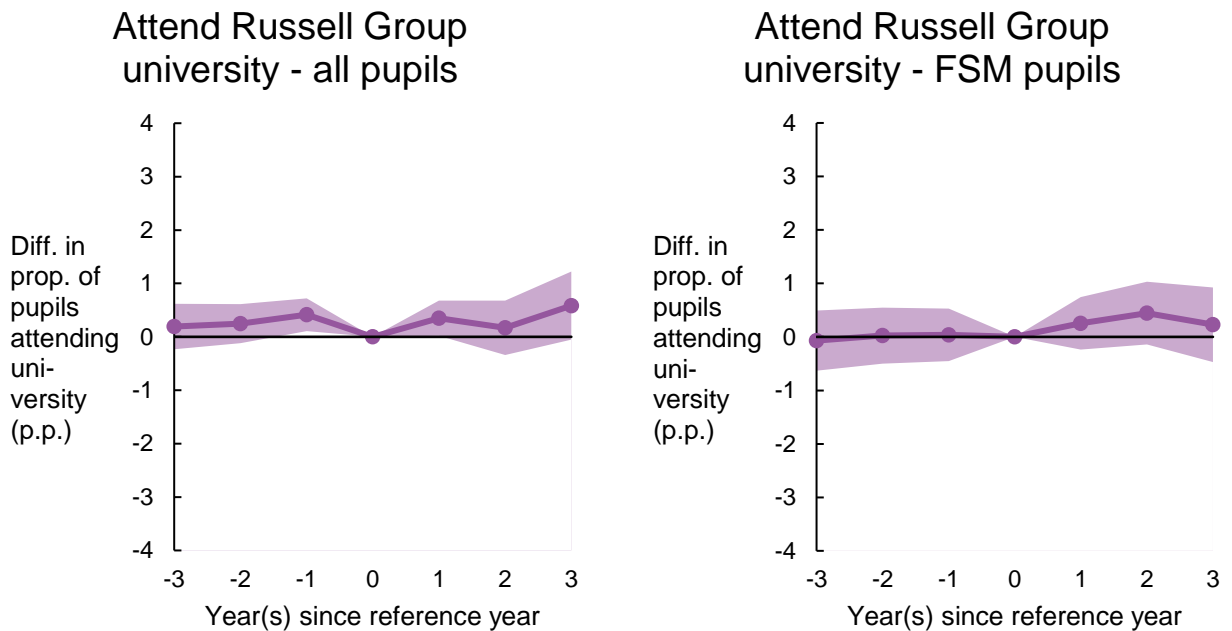


Note: Reference year refers to the year in which a Teach First school recruited its first Teach First trainee, and the year in which a comparison school was matched to a Teach First school. Section 2 details the statistical matching. Estimates were not statistically significant where the confidence interval crossed the horizontal axis.

Source: NFER analysis of HESA (for 2009/10 – 2018/19) and Teach First (for 2012/13 – 2018/19) data.

Additionally, like with our estimates of impact on university attendance in section 5.4.1, our results are highly dependent on the statistical matching. An additional specification of the model using an alternative matching weight leads to a different result. Specifically, Figure 17 shows that there are no statistically significant differences in Russell Group university attendance associated with recruiting a Teach First trainee, either overall or for FSM-eligible pupils.. This suggests that the positive impact on university attendance rates shown in Figure 14 may have been driven in part by the statistical matching rather than a genuine impact associated with recruiting a Teach First trainee.

Figure 17 The findings were highly dependent on the statistical matching – there were no statistically significant differences in Russell Group university attendance rates between Teach First and similar comparison schools using a different matching technique



Note: Reference year refers to the year in which a Teach First school recruited its first Teach First trainee, and the year in which a comparison school was matched to a Teach First school. Section 2 details the statistical matching. Estimates were not statistically significant where the confidence interval crossed the horizontal axis.

Source: NFER analysis of HESA (for 2009/10 – 2018/19) and Teach First (for 2012/13 – 2018/19) data.

Overall, there is therefore some suggestive evidence that recruiting a Teach First trainee is associated with a higher proportion of pupils attending university and Russell Group universities. However, there are significant caveats associated with these findings and caution should therefore be exercised in interpreting any of these findings as representative of the direct impact of Teach First teachers on pupils’ university attendance outcomes.

5.5 Key Stage 2 reading and mathematics attainment

Finally, in this section, we show how the educational attainment of pupils in primary schools was affected by primary schools which recruited a Teach First trainee.

We considered Key Stage 2 attainment in reading and mathematics only. This is because attainment in writing is assessed by teachers and may be more subjective than attainment in reading and mathematics, which is measured by a standardised test. Our analysis was based on a

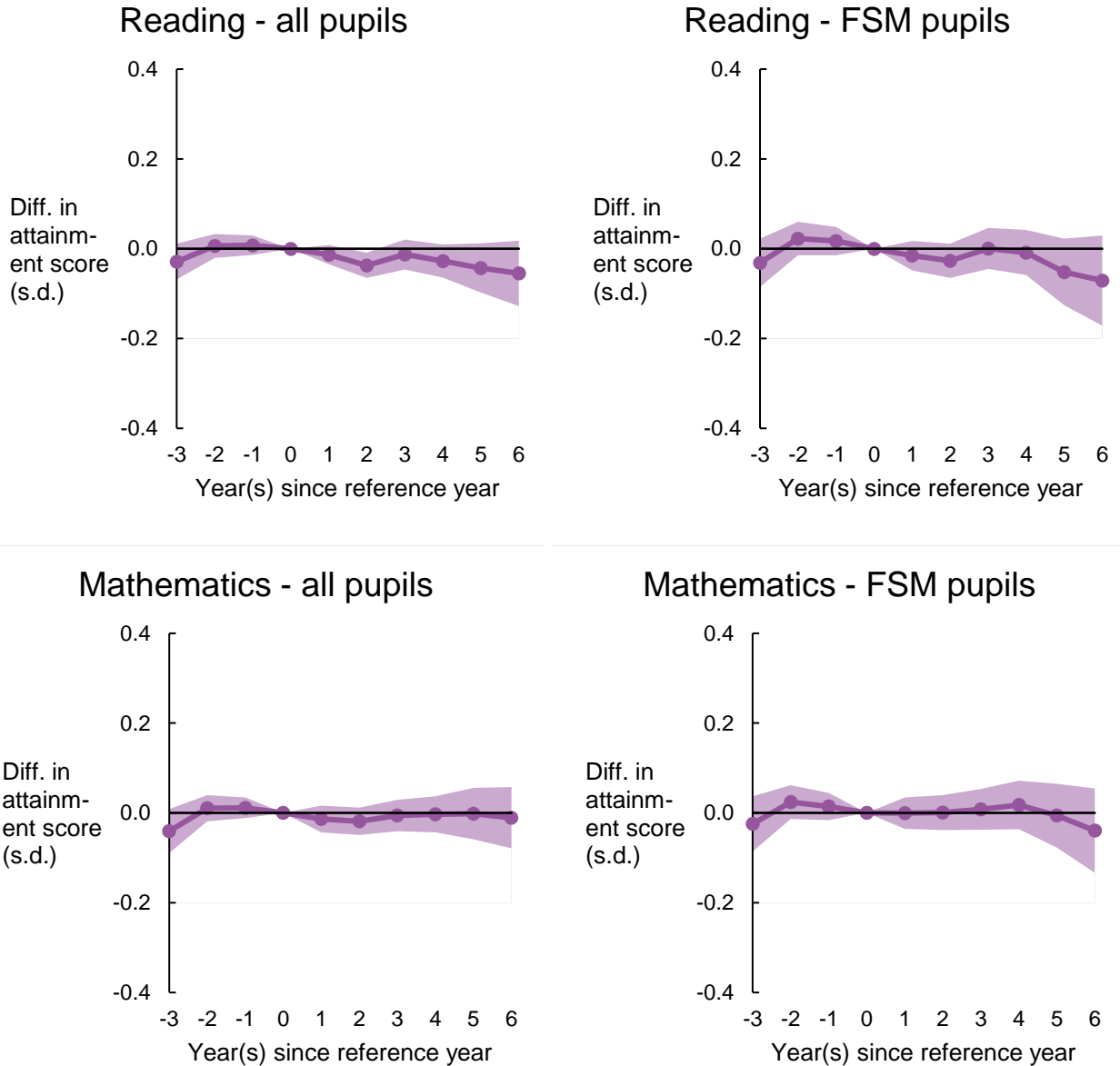
regression model of subject-specific Key Stage 2 attainment scores in Teach First and similar comparison schools before and after the year the school became a Teach First school.

Figure 18 shows the effect of becoming a Teach First school on reading and mathematics scores (in the top and bottom panes, respectively). There were no statistically significant differences in either reading or mathematics attainment between Teach First and similar comparison schools in the years after a school became a Teach First school. This was true for all pupils and just pupils eligible for FSM.

Primary Teach First schools therefore had similar whole school-level Key Stage 2 attainment than otherwise similar comparison primary schools. This is not necessarily surprising given the relatively few primary Teach First teachers, and their distribution across many schools, as shown in section 4.

Since primary teachers generally teach one year group per year, and the programme is two years in duration, the potential direct impact of a Teach First teacher likely only extends to a small proportion of the pupils in the school. Similarly to how school-level GCSE impact estimates were not statistically significant, the impact of Teach First on Key Stage 2 attainment at the whole school level may be too diluted amongst other pupils who were not directly exposed to the Teach First teacher. There may also have been a significant lag between when a primary school pupil was taught by a Teach First teacher and when they sat their Key Stage 2 assessments in year 6, further reducing any potential whole-school direct impact.

Figure 18 There were no statistically significant differences in pupil attainment between Teach First schools and similar comparison schools in the years after Teach First schools recruited their first Teach First teacher



Note: Reference year refers to the year in which a Teach First school recruited its first Teach First trainee, and the year in which a comparison school was matched to a Teach First school. Section 2 details the statistical matching. Estimates were not statistically significant where the confidence interval crossed the horizontal axis.

There were no statistically significant differences across years or any of the regions of England. There were also no statistically significant differences in impact between schools that recruited different numbers of trainees, or that engaged in one or more Teach First programmes.

6 Conclusions

Our findings highlighted some of the key differences between Teach First schools (i.e. schools that recruited a Teach First teacher) and other schools in England, and some of the positive benefits Teach First brought to its schools.

Teach First partners with schools that serve pupils in the most disadvantaged communities in the country. Teach First schools, therefore, had systematically different characteristics from other schools in the year they recruited their first Teach First trainee. The majority of Teach First schools were in the highest quintile of pupil deprivation, based on both the Income Deprivation Affecting Children Index (IDACI) and free school meal (FSM) eligibility. Teach First schools were also more likely to be in the lowest attainment quintile, and a lower proportion of pupils from Teach First schools attended university.

Teacher workforce challenges were also considerably more acute in Teach First schools than other schools in England. Teach First schools were more likely than other schools to have had a teaching vacancy, to be among the school with the highest per-pupil expenditure on supply staff and to be among the schools with the highest proportion of inexperienced staff.

Teach First aims to have an impact on the workforce challenges facing disadvantaged schools. Accordingly, Teach First schools may have viewed Teach First teachers as an additional recruitment tool available to them, as our findings showed that Teach First trainee recruitment tended to supplement existing sources of new teacher recruitment. Specifically, in the years after they recruited their first Teach First trainee, both Teach First primary and secondary schools recruited statistically significantly more teachers from non-Teach First routes than similar comparison schools. Secondary schools were also more likely than primary schools to recruit more than one Teach First trainee, and additional Teach First trainees in the years after their first.

However, recruiting Teach First trainees did not appear to have had a significant impact on schools' recruitment and retention situation. Specifically, after recruiting their first Teach First trainee, there were no statistically significant differences between Teach First schools and similar comparison schools in terms of their expenditure on supply staff, unfilled vacancies or temporarily-filled positions, and turnover rates.

However, Teach First teachers may well have had an impact on workforce challenges in disadvantaged schools more widely. Our analysis of Teach First teachers' career paths showed that Teach First teachers were more likely than otherwise similar teachers to stay working within disadvantaged schools (McLean and Worth, 2023). The workforce impacts of recruitment from Teach First may therefore have been spread out amongst disadvantaged schools more broadly, rather than concentrated only in the schools which recruited Teach First trainees. Additionally, the workforce measures we included in the analysis were only a limited set of proxies for workforce challenges, which may not necessarily have represented a complete picture of workforce impacts.

GCSE attainment in the secondary school departments that recruited a Teach First trainee was statistically significantly higher than in similar departments in comparison schools. The difference was small (0.01 standard deviations two years after a school recruited their first Teach First teacher), and likely reflected a direct impact of Teach First teachers on the outcomes of the pupils

they taught. This impact was focussed mainly within the departments in which Teach First teachers taught. That is, becoming a Teach First school was not associated with any statistically significant differences in whole-school GCSE attainment.

There was some evidence to suggest that becoming a Teach First school may be associated with an impact on pupils attending university and Russell Group universities. While our baseline model suggested that becoming a Teach First school was associated with an increase in university attendance rates relative to similar comparison schools, there were significant caveats associated with this finding. Specifically, the proportion of pupils attending university in Teach First schools, compared to similar comparison schools, had been increasing over time even before schools became Teach First schools. This meant that our estimates likely reflected a continuation of this trend rather than any impact associated with Teach First teachers. The results were also highly dependent on how we implemented the statistical matching in the analysis. This meant that our results may also have been driven by differences in the sample of pupils in our analysis, rather than any underlying impact associated with Teach First teachers.

There were no other statistically significant differences in Key Stage 2 reading and mathematics attainment or A level attainment associated with schools becoming a Teach First school. For Key Stage 2 attainment, this may have been because primary teachers generally teach one year group per year. Since the Teach First Training Programme is two years in duration, the potential direct impact of a Teach First teacher likely only extended to a small proportion of the pupils in the school. This meant that any whole-school direct impact on Key Stage 2 attainment was likely to be smaller than for secondary pupils. For some primary pupils, there may also have been a significant lag between when they were taught by a Teach First teacher and when they sat their Key Stage 2 assessments in Year 6, further reducing any potential whole-school direct impact.

Similarly, few Teach First secondary schools had sixth forms, so in many cases Teach First teachers were unable to have had a direct impact on A level attainment. There would therefore be a lag of a few years between when secondary pupils were taught by a Teach First teacher and when they sat their A level assessments, which likely further reduced potential impact.

Overall, the findings highlight that there were positive differences between Teach First schools and similar comparison schools that were statistically significant but small and there were no indications that recruiting a Teach First trainee had any negative impacts on schools or pupils.

References

- Allen, R. *et al.* (2014) *The costs and benefits of different Initial Teacher Training routes*. IFS Report R100. IFS. Available at: <https://doi.org/10.1920/re.ifs.2014.0100>.
- Allen, R. and Allnutt, J. (2017) 'The impact of Teach First on pupil attainment at age 16', *British Educational Research Journal*, 43(4), pp. 627–646. Available at: <https://doi.org/10.1002/berj.3288>.
- Allen, R., Mian, E. and Sims, S. (2016) *Social inequalities in access to teachers*. Available at: <https://ffteducationdatalab.org.uk/wp-content/uploads/2016/05/Social-Market-Foundation-Social-inequalities-in-access-to-teachers.pdf> (Accessed: 9 September 2022).
- Allen, R., Parameshwaran, M. and Nye, P. (2016) *The careers of Teach First Ambassadors who remain in teaching: job choices, promotion and school quality*. Available at: <https://ffteducationdatalab.org.uk/wp-content/uploads/2016/07/The-careers-of-Teach-First-Ambassadors-who-remain-in-teaching-FINAL.pdf> (Accessed: 30 June 2023).
- An, Y. and Koedel, C. (2021) 'How do teachers from alternative pathways contribute to the teaching workforce in urban areas? Evidence from Kansas City', *AERA Open*, 7, pp. 1–20. Available at: <https://doi.org/10.1177/23328584211026952>.
- Angrist, J.D. and Pischke, J.-S. (2009) *Mostly Harmless Econometrics*. Princeton University Press.
- Bertrand, M., Duflo, E. and Mullainathan, S. (2004) 'How Much Should We Trust Differences-in-Differences Estimates?', *The Quarterly Journal of Economics*, 119(1), pp. 249–275.
- Birchall, M. (2021) *The Times Top 100 Graduate Employers: the definitive guide to the leading employers recruiting graduates during 2021-2022*. London: High Fliers Publications Limited.
- Chacon, A. and Pena, P. (2017) *The impact of Enseña por México on student socioemotional skills*. Available at: <http://www.microanalitica.com/TFA/The%20impact%20of%20Ensen%20por%20Mexico%20on%20student%20socioemotional%20skills.pdf> (Accessed: 30 June 2023).
- Hainmueller, J. (2012) 'Entropy Balancing for Causal Effects: A Multivariate Reweighting Method to Produce Balanced Samples in Observational Studies', *Political Analysis*, 20(1), pp. 25–46. Available at: <https://doi.org/10.1093/pan/mpr025>.
- Hutchings, M. *et al.* (2006) *An evaluation of innovative approaches to teacher training on the Teach First programme*. Available at: https://www.academia.edu/867948/An_Evaluation_of_Innovative_Approaches_to_Teacher_Training_on_the_Teach_First_Programme_Final_Report_to_the_Training_Aud (Accessed: 30 June 2023).
- Hutchinson, J. (2016) *School inspection in England: Is there room to improve?* Available at: <https://epi.org.uk/publications-and-research/school-inspection-england-room-improve/> (Accessed: 30 June 2023).

Jerrim, J. *et al.* (2018) 'Inequalities in educational achievement across the United Kingdom . How big are the gaps and how have they changed over time ?', in. Available at: <https://www.semanticscholar.org/paper/Inequalities-in-educational-achievement-across-the-Jerrim-Shure/b6b62b53052235de5be174fad08520aa27c86e64> (Accessed: 30 June 2023).

Leuven, E. and Sianesi, B. (2018) 'PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing', *Statistical Software Components*. Boston College Department of Economics. Available at: <https://ideas.repec.org/c/boc/bocode/s432001.html> (Accessed: 30 June 2023).

McLean, D. and Worth, J. (2023) *The progression and retention of Teach First teachers*. Slough: NFER.

Muijs, D. *et al.* (2010) *The impact of Teach First teachers in schools*. Available at: http://www.teachforallnetwork.com/articles/max_impact.pdf (Accessed: 30 June 2023).

Muijs, D., Chapman, C. and Armstrong, P. (2013) 'Teach First: pedagogy and outcomes. The impact of an alternative certification programme', *Journal for educational research online*, 4(2), pp. 29–64. Available at: <https://doi.org/10.25656/01:7480>.

OECD (2022) *Mending the education divide: getting strong teachers to the schools that need them most*. Paris: OECD. Available at: <https://www.oecd.org/education/talis/mending-the-education-divide-92b75874-en.htm> (Accessed: 9 September 2022).

Ofsted (2011) *Teach First: Initial teacher education inspection report*. Available at: <https://files.ofsted.gov.uk/v1/file/1720861> (Accessed: 30 June 2023).

Ofsted (2015) *Teach First London ITE Partnership: Initial teacher education inspection report*. Available at: <https://files.ofsted.gov.uk/v1/file/2563560> (Accessed: 30 June 2023).

Penner, E.K. (2021) 'Teach For America and teacher quality: increasing achievement over time', *Educational Policy*, 35(7), pp. 1047–1084. Available at: <https://doi.org/10.1177/0895904819843595>.

Rubin, D.B. (1980) 'Bias reduction Using Mahalanobis-metric matching', *Biometrics*, 36(2), pp. 293–298. Available at: <https://doi.org/10.2307/2529981>.

Sibieta, L. (2020) *Teacher shortages in England: analysis and pay options*. London. Available at: https://epi.org.uk/wp-content/uploads/2020/02/Teacher-shortages-and-pay_2020_EPI.pdf (Accessed: 30 June 2023).

Starkey-Midha, G. (2020) *Building a fairer future. Tackling the attainment gap in GCSE English and maths*. Teach First. Available at: <https://www.teachfirst.org.uk/sites/default/files/2020-08/GCSE%20report%20-%20Building%20a%20fairer%20future..pdf> (Accessed: 30 June 2023).

Strand, S. (2014) 'School effects and ethnic, gender and socio-economic gaps in educational achievement at age 11', *Oxford Review of Education*, 40(2), pp. 223–245. Available at: <https://doi.org/10.1080/03054985.2014.891980>.

Teach First (2022a) *Annual Report and Accounts: 2020-2021*. Available at: <https://www.teachfirst.org.uk/sites/default/files/2022-04/2020-21%20TF%20Annual%20Report.pdf> (Accessed: 30 June 2023).

Teach First (2022b) *Application and assessment FAQs, Teach First application and assessment FAQs*. Available at: <https://www.teachfirst.org.uk/knowledge-base/training-programme/application> (Accessed: 30 June 2023).

Weidmann, B. and Miratrix, L. (2020) 'Lurking inferential monsters? Quantifying selection bias in evaluations of school programs', *Journal of Policy Analysis and Management*, 40(3), pp. 964–986. Available at: <https://doi.org/10.1002/pam.22236>.

Wooldridge, J. (2015) *Introductory Econometrics: A Modern Approach*. 6th edn. Cengage Learning. Available at: https://books.google.co.uk/books?hl=en&lr=&id=wUF4BwAAQBAJ&oi=fnd&pg=PR3&ots=cAYyZGowok&sig=QCrKYyQgpHWVa0cPtn_31xs9KVg&redir_esc=y (Accessed: 30 June 2023).

Worth, J. and Faulkner-Ellis, H. (2022a) *Teacher labour market in England. Annual report 2022*. NFER, p. 20. Available at: https://www.nfer.ac.uk/media/4885/teacher_labour_market_in_england_annual_report_2022.pdf (Accessed: 30 June 2023).

Worth, J. and Faulkner-Ellis, H. (2022b) 'Teacher supply and shortages: The implications of teacher supply challenges for schools and pupils', p. 52.

Wright, A. *et al.* (2019) *Evaluation report for teach for America*. Center on Research and Evaluation. Available at: https://www.smu.edu/-/media/Site/Simmons/Research/CORE/PDFs/TFA_TXImpact_Final-Report_February2019.pdf (Accessed: 30 June 2023).

7 Methodological appendix

This section provides additional details on the methodology used in this evaluation. We outlined the main methodology of the evaluation (including data sources, the statistical matching and regression modelling specifications) in section 2 as these components were key to a complete understanding of the main evaluation results. This section complements that summary and is intended to address further details on the methodology, including specifics on how we linked datasets, details on the matching (including balance tables) and further details on the difference-in-differences model specifications.

7.1 Data matching and imputation

This analysis used linked data from the School Workforce Census (SWC), Initial Teacher Training Performance Profiles (ITT-PP) and Teach First database. The DfE performed the data linkage prior to the start of the evaluation by linking first the ITT-PP data to the SWC and then the Teach First database to the ITT-PP/SWC linkage. The DfE used identifiable teacher characteristics (e.g. Teacher Reference Number (TRN), names and birth dates) as part of the linkage process, which were then converted to anonymised identifiers for analytical use.

To generate our main analysis sample, we linked each dataset together using the anonymised identifiers. The SWC is a longitudinal dataset (meaning it records the same teachers over time), while the ITT-PP and Teach First database contain only one record per trainee.³⁵ We first matched the Teach First database to the ITT-PP as a one-to-one match (on the anonymised identifier) and then matched the product of this linkage to the SWC as a one-to-many match.

We linked in further information on school characteristics which were derived from the DfE's public register of school information.³⁶ This encompassed geographic, financial, deprivation, pupil capacity, attainment and other school-level workforce variables which we used as part of the matching and regression analysis. We linked this information to the SWC/ITT-PP/Teach First database linkage using a school's URN. We generated an additional school indicator which was used to account for schools changing URN over time, either by merging or splitting apart, which ensured that we linked each SWC URN to the correct URN in the school-level database. We also linked school-level IDACI information to our main analysis database (using the URN identifier). IDACI information was derived from the National Pupil Database (NPD), for which we observed data up to 2018/19.

We identified Teach First schools based on the list of schools in the Teach First data that had ever recruited a Teach First trainee. As we noted in section 2, we excluded schools from the analysis

³⁵ There were, however, some duplicate records in the Teach First dataset which we removed as part of the initial data cleaning. Most of these duplicate records were identical except for the school in which the trainee was placed in their NQT year. In these cases, we used the linkage to the SWC in order to determine which record was correct, and we discarded the other, duplicate record. In cases where neither school linked to an SWC record, we discarded one of the duplicate Teach First records at random.

³⁶ <https://www.get-information-schools.service.gov.uk/>

which recruited their first Teach First trainee prior to 2010 as we were unable to include them in the statistical matching. We also excluded schools from the analysis where a Teach First trainee’s recorded school in the Teach First data did not align with the school recorded in the SWC for that teacher’s first training year, which likely reflected data entry errors. There were relatively few cases of such school mismatches, but all were excluded due to concerns around sample contamination.

We also included a few additional schools in the analysis where Teach First teachers were missing from the Teach First data but recorded as a Teach First trainee in the ITT-PP data. In these cases, as well as all other cases where a Teach First teachers’ recorded placement school was missing from the Teach First data, we imputed each Teach First trainee’s placement school based on the school they were placed in during their first training year, as recorded in the SWC records.

A Teach First school’s ‘reference year’ (i.e. the year to which we benchmark pupil attainment) was defined as the year in which that school recruited its first Teach First trainee. We used the time-invariant URN identifier to derive Teach First schools and their reference years in order to ensure we tracked the same school over time.

7.2 Matching methodology

A key part of our analysis of the pupil attainment and university attendance rate impacts involved comparing schools that recruited Teach First teachers to schools which did not recruit any Teach First teachers on a like-for-like basis. As we discussed in section 1, this was very important as Teach First and comparison schools differed significantly in their characteristics, in ways which were likely to have influenced pupil attainment. We therefore implemented statistical matching of Teach First schools to ensure that these differences did not confound our main results.

As we noted in section 2, we matched Teach First schools to comparison schools using Mahalanobis metric matching (Rubin, 1980). The variables we used for the matching included key pupil and workforce characteristics of the school in the year in which it recruited its first Teach First teacher. We matched on these characteristics because they were either directly related to a school’s eligibility to recruit Teach First trainees or otherwise differed significantly between Teach First schools and comparison schools. These characteristics are listed in Tables 1 and 2.

We estimated ‘quintiles’ for each of our key school characteristics, meaning the characteristics are categorical rather than continuous. For example, a school that has a very high proportion of their pupils eligible for FSM may be in the top 20 per cent (i.e. top quintile) of schools in England in that year for proportion of their pupils eligible for FSM. This was primarily in order to accommodate missing values in the data (which were recorded as a separate ‘missing’ category and matched to other schools with a missing observation of that characteristic).

All school characteristics except IDACI proportion were observed in the SWC data or in the DfE’s public register of information about schools,³⁷ which we linked to the SWC. We derived IDACI

³⁷ See <https://www.get-information-schools.service.gov.uk/>

proportion from data in the NPD data. We then linked school-level IDACI proportion to the SWC by matching school's URNs.

We performed Mahalanobis matching separately for primary and secondary schools. We also matched exactly on year and region, by matching Teach First schools to comparison schools in the same region which had similar characteristics in the year in which they recruited their first Teach First trainee. To do this, we performed stratified matching (Leuven and Sianesi, 2018), for which we defined groups within our sample of schools based on the combination of region and year in which a school recruited its first trainee. We then performed Mahalanobis matching within that group.

Within the same year and region group, we matched each Teach First primary school with up to 10 of its 'nearest neighbours', that is, the most-similar schools which had not recruited a Teach First trainee, where similarity was based on the Mahalanobis distance. For secondary schools, we matched with up to five of its nearest neighbours, since there were fewer schools in the potential comparison group. We applied a caliper of 100 on the Mahalanobis distance to each nearest neighbour for primary schools, and a caliper of 50 for secondary schools, to ensure that we matched each Teach First school with a reasonably similar comparison school.³⁸ We also implemented nearest neighbour matching with replacement, meaning that each school in the comparison group may have matched with Teach First schools multiple times. Post-matching, we ensured that this did not lead to potential bias due to comparison schools being matched to Teach First schools an excessive number of times.

As a final step, we combined all stratified matches together (including matching weights) into the main matched groups for the analysis. We derived one matched group for primary schools and one for secondary schools, as we analysed attainment outcomes for Key Stage 2 and other outcomes separately. We analysed Key Stage 4, 5 and university attendance outcomes based on the matched sample of secondary schools.

We also explored whether other matching techniques were viable alternative methods, in order to ensure that our methodological choices were not a key driver of our results. We first investigated propensity score matching and coarsened exact matching, however, neither were able to provide a usable matched sample.

Due to the stratified matching approach (which we used in order to match exactly on training year and region), we were unable to include the full suite of matching variables within a propensity score matching model. This was because there was insufficient sample size of schools within each training year and region combination to estimate a logit model explaining selection into the Teach First programme as a function of all observed covariates.

³⁸ A caliper in Mahalanobis metric matching is less interpretable than in the propensity score matching framework. Nonetheless, the caliper reflects an upper limit on the allowable Mahalanobis distance between each Teach First school and a potential match in the comparison group. As with all research designs which use a matching methodology, the imposition of a caliper involves a bias-variance trade-off. We used the stated calipers as they led to both acceptable balance in the matched sample and reasonable sample sizes.

Similarly, coarsened exact matching was not able to provide a usable matched sample because the sample size of comparison schools within each training year and region group was too small to exactly match on the observed characteristics. While removing characteristics or further coarsening them would potentially be a solution, this would likely lead to a worse balance than Mahalanobis matching.

We also explored entropy balancing as an alternative matching technique, which did lead to a usable matched sample. Entropy balancing involves a statistical weighting to ensure that balance in the matching characteristics are identical between Teach First and similar comparison schools (Hainmueller, 2012). Crucially, entropy balancing discards far fewer observations from the sample than Mahalanobis matching as it assigns a matching weight to each observation, with poor matches being assigned very low weights. Accordingly, the balance in the entropy balanced sample was better than in the Mahalanobis balanced sample, and the sample sizes were larger.

We conducted additional robustness checking of whether our estimates were dependent on our choice of matching technique. In the majority of cases, estimates for our baseline models and alternative models estimated using the entropy balance weight were nearly identical, which was reassuring evidence that the Mahalanobis metric matching was not a main driver of our results. To align our methodology with our analysis of Teach First teachers' career trajectories, as well as the existing literature, we used the Mahalanobis matching weights for our main results.

Our choice of matching technique did, however, have a qualitative impact on our university and Russell Group university attendance results. Specifically, we found that there was a statistically significant impact using the Mahalanobis weight and no statistically significant impact using the entropy balance weight. We discussed this, and the implications for our findings, in more detail in section 5.4.

7.3 Balance tables

Table 1 shows the differences between Teach First and comparison primary schools in the key characteristics included in the matching. Teach First schools tended to have much higher proportions of their pupils from deprived backgrounds (based on IDACI) and who were eligible for FSM. Teach First schools also were more likely than comparison schools to be among the schools that spent the most per-pupil on supply staff, had more teachers with less than two years of experience and had the lowest attainment. Teach First primary schools were also more likely than comparison schools to be in London and the West Midlands, and were spread roughly evenly across years.

The matching led to a better balance in the matched sample. After the matching, the proportion of Teach First primary schools across each characteristic was generally within ten percentage points of similar comparison primary schools.

The matching inevitably discarded schools from the sample that did not have a suitable match, both for the Teach First and comparison group. This is because the matched sample focussed on those schools which were the most similar in observed characteristics to Teach First schools, and excluded schools which were too dissimilar (i.e. the Mahalanobis distance was greater than the

applied caliper). We included comparison schools in the unmatched sample multiple times – once for each year in which a school might be matched to a Teach First school (i.e. a school open over many years may have matched to a Teach First school multiple times, over different years).

There were 90,638 school-year combinations in the unmatched sample for comparison primary schools. The matched sample consisted of 676 Teach First schools, matched to 5,645 similar comparison schools. This was about six per cent of the number of school-year combinations available in the unmatched sample, indicating that Teach First primary schools were, generally, quite dissimilar from many other primary schools in England.

Table 1 School characteristics before and after matching for primary schools

| Variable | | Unmatched sample proportions (%) | | Matched sample proportions (%) | |
|--|----------------------------|----------------------------------|---------------------|--------------------------------|---------------------|
| | | Comparison schools | Teach First schools | Comparison schools | Teach First Schools |
| Quintile of IDACI deprivation index | First quintile | 41.3 | 1.5 | 6.1 | 1.5 |
| | Third quintile | 20.5 | 5.3 | 7.6 | 5.3 |
| | Fourth quintile | 19.6 | 28.2 | 24.8 | 28.3 |
| | Fifth quintile | 18.6 | 65.0 | 61.5 | 64.9 |
| Quintile of FSM eligibility | First quintile | 20.6 | < 1.5* | 2.8 | < 1.5* |
| | Second quintile | 20.1 | 2.2 | 4.2 | 2.2 |
| | Third quintile | 19.5 | 10.6 | 10.8 | 10.7 |
| | Fourth quintile | 19.2 | 26.9 | 24.2 | 26.9 |
| | Fifth quintile | 18.9 | 57.9 | 57 | 57.8 |
| | Unknown | 1.7 | < 1.5* | 1.0 | < 1.5* |
| Quintile of expenditure on supply staff per pupil | First quintile | 18.6 | 18.6 | 16.4 | 18.6 |
| | Second quintile | 19.8 | 12.7 | 12.9 | 12.7 |
| | Third quintile | 20.4 | 14 | 13.9 | 14.1 |
| | Fourth quintile | 20.2 | 18.6 | 18.7 | 18.6 |
| | Fifth quintile | 18.9 | 31.3 | 34.3 | 31.4 |
| | Unknown | 2.2 | 4.7 | 3.7 | 4.6 |
| Quintile of teachers in their first two years of teaching | First quintile | 28.2 | 3.1 | 11.8 | 3.1 |
| | Second quintile | 10.5 | 5.2 | 5.7 | 5.2 |
| | Third quintile | 22.1 | 17.4 | 19.7 | 17.5 |
| | Fourth quintile | 21.1 | 23.3 | 24.9 | 23.4 |
| | Fifth quintile or unknown | 18.0 | 51.0 | 37.9 | 50.9 |
| Quintile of Key Stage 2 attainment | First attainment quintile | 19.4 | 38.6 | 40.5 | 38.6 |
| | Second attainment quintile | 20.2 | 22.5 | 22.5 | 22.3 |

| Variable | | Unmatched sample proportions (%) | | Matched sample proportions (%) | |
|---|----------------------------|----------------------------------|------|--------------------------------|------|
| (in reference year) | Third attainment quintile | 20.5 | 18.5 | 17.7 | 18.5 |
| | Fourth attainment quintile | 19.9 | 11.4 | 11.0 | 11.4 |
| | Fifth attainment quintile | 19.9 | 9.2 | 8.4 | 9.2 |
| Quintile of Key Stage 2 attainment (one year prior to reference year) | First attainment quintile | 18.4 | 39.1 | 41.5 | 39.2 |
| | Second attainment quintile | 20 | 26.7 | 25.5 | 26.8 |
| | Third attainment quintile | 19.8 | 13.9 | 14.1 | 13.9 |
| | Fourth attainment quintile | 19.7 | 12.0 | 9.9 | 12.0 |
| | Fifth attainment quintile | 19.4 | 5.9 | 7.3 | 5.9 |
| | Unknown | 2.6 | 2.4 | 1.7 | 2.2 |
| Quintile of Key Stage 2 attainment (two years prior to reference year) | First attainment quintile | 18.2 | 44.8 | 45.6 | 44.8 |
| | Second attainment quintile | 20.0 | 25.3 | 23.9 | 25.3 |
| | Third attainment quintile | 19.5 | 13.3 | 13.7 | 13.3 |
| | Fourth attainment quintile | 19.9 | 11.8 | 9.9 | 11.8 |
| | Fifth attainment quintile | 19.4 | 3.1 | 5.2 | 3.0 |
| | Unknown | 3.1 | 1.8 | 1.7 | 1.8 |
| Whether the school had a vacancy | School has no vacancy | 90.1 | 81.8 | 87.8 | 81.8 |
| | School has vacancy | 9.9 | 18.2 | 12.2 | 18.2 |
| Region | East of England | 10.1 | 7.4 | 7.4 | 7.4 |
| | East Midlands | 10 | 8.9 | 8.9 | 8.9 |
| | West Midlands | 10.4 | 16.2 | 16.3 | 16.3 |
| | Inner London | 4.1 | 13.0 | 12.7 | 12.9 |
| | Outer London | 6.2 | 15.5 | 15.4 | 15.5 |
| | North East | 5.2 | 4.3 | 4.3 | 4.3 |
| | North West | 17.1 | 8.4 | 8.5 | 8.4 |

| Variable | | Unmatched sample proportions (%) | | Matched sample proportions (%) | |
|---|--------------------------|----------------------------------|------|--------------------------------|------|
| | South East | 15.4 | 11.2 | 11.2 | 11.2 |
| | South West | 10.0 | 5.5 | 5.5 | 5.5 |
| | Yorkshire and the Humber | 11.4 | 9.6 | 9.7 | 9.6 |
| Reference year | 2012 | 12.9 | 12.3 | 12.3 | 12.3 |
| | 2013 | 13.0 | 14.6 | 14.7 | 14.6 |
| | 2014 | 14.7 | 18.5 | 18.4 | 18.3 |
| | 2015 | 14.8 | 20.8 | 20.5 | 20.9 |
| | 2016 | 14.7 | 12.0 | 12.1 | 12.0 |
| | 2017 | 14.9 | 12.3 | 12.3 | 12.3 |
| | 2018 | 15.1 | 9.6 | 9.6 | 9.6 |
| Number of school-year combinations | | 90,638 | 677 | 5,645 | 676 |
| Proportion of sample kept | | - | - | 6.2 | 100 |

Note: * denotes where frequencies were rounded due to small sample sizes.

Source: NFER analysis of SWC, ITT-PP and Teach First data for 2010/11 – 2018/19.

Similar to primary schools, Table 2 shows that there were significant differences between Teach First and comparison secondary schools before matching. Teach First schools tended to have much higher proportions of their pupils from deprived backgrounds and who were eligible for FSM. Teach First schools also were more likely than comparison schools to be among the schools which spent the most per-pupil on supply staff, had more teachers with less than two years of experience and had the lowest attainment. Teach First secondary schools were also more likely than comparison schools to be in London and the West Midlands, and were spread roughly evenly across years.

The matching led to an improved balance in the matched sample, however the balance in the matched sample was not as close as in the sample of matched primary schools. After the matching, the proportion of Teach First secondary schools across each characteristic was generally within twenty percentage points of similar comparison secondary schools, but the differences were all considerably smaller than in the unmatched sample.

As with the matching for primary schools, matching for secondary schools also inevitably discarded schools from the sample which did not have a suitable match. The matching discarded more schools in the secondary sample than in the primary sample. This was because there are, generally, fewer secondary schools in England than primary schools and Teach First has been placing trainees in secondary schools longer than in primary schools. Therefore, the proportion of secondary schools already partnered with Teach First was likely higher than for primary schools (and accordingly, the sample of potential secondary school matches lower). Lower numbers of secondary schools also meant that there were fewer secondary schools that were sufficiently

similar to Teach First secondary schools to be matched. The matched sample consisted of 332 Teach First secondary schools, matched to 1,164 similar comparison schools. This is about eight per cent of the 15,219 school-year combinations for secondary schools in the unmatched sample, indicating that Teach First secondary schools were, generally, quite dissimilar from most other secondary schools in England.

Table 2 School characteristics before and after matching for secondary schools

| Variable | | Unmatched sample proportions (%) | | Matched sample proportions (%) | |
|--|---------------------------|----------------------------------|---------------------|--------------------------------|---------------------|
| | | Comparison schools | Teach First schools | Comparison schools | Teach First schools |
| Quintile of IDACI deprivation index | First and second quintile | 53.5 | 3.4 | 18.7 | 3.9 |
| | Third quintile | 22.6 | 10.0 | 16.7 | 10.8 |
| | Fourth quintile | 15.9 | 45.0 | 35.6 | 47.3 |
| | Fifth quintile | 8.0 | 41.6 | 29.0 | 38.0 |
| Quintile of FSM eligibility | First and second quintile | 28.0 | < 6.9* | 19.9 | 6.0 |
| | Third quintile | 21.8 | 14.7 | 19.1 | 16.3 |
| | Fourth quintile | 15.4 | 35.0 | 28.6 | 36.1 |
| | Fifth quintile | 9.4 | 43.4 | 32.3 | 41.6 |
| Quintile of expenditure on supply staff per pupil | First quintile or unknown | 23.4 | 22.9 | 19.9 | 19.9 |
| | Second quintile | 21.7 | 15.3 | 14.3 | 16.3 |
| | Third quintile | 20.6 | 16.6 | 18.1 | 16.9 |
| | Fourth quintile | 19.0 | 16.8 | 20.2 | 18.1 |
| | Fifth quintile | 15.3 | 28.4 | 27.4 | 28.9 |
| Quintile of teachers in their first two years of teaching | First quintile | 21.4 | 3.4 | 13.2 | 3.6 |
| | Second quintile | 24.5 | 12.1 | 20.7 | 12.7 |
| | Third quintile | 22.7 | 21.1 | 20.8 | 22.6 |
| | Fourth quintile | 19.3 | 29.7 | 24.7 | 29.8 |
| | Fifth quintile or unknown | 12.1 | 33.7 | 20.6 | 31.3 |

| Variable | | Unmatched sample proportions (%) | | Matched sample proportions (%) | |
|---|--------------------------------------|----------------------------------|------|--------------------------------|------|
| | | | | | |
| Quintile of Key Stage 4 attainment (in reference year) | First attainment quintile | 13.7 | 34.2 | 29.0 | 34.6 |
| | Second attainment quintile | 17.7 | 22.9 | 20.5 | 22.9 |
| | Third attainment quintile | 21.2 | 16.8 | 17.6 | 17.2 |
| | Fourth attainment quintile | 22.7 | 16.1 | 15.9 | 15.7 |
| | Fifth attainment quintile | 24.6 | 10.0 | 17.0 | 9.6 |
| Quintile of Key Stage 4 attainment (one year prior to reference year) | First attainment quintile | 13.3 | 31.6 | 29.3 | 33.1 |
| | Second attainment quintile | 17.7 | 22.1 | 18.5 | 22.3 |
| | Third attainment quintile | 20.7 | 17.6 | 18.6 | 17.8 |
| | Fourth attainment quintile | 22.3 | 13.9 | 16.6 | 15.4 |
| | Fifth attainment quintile or unknown | 26.0 | 14.8 | 16.9 | 11.4 |
| Quintile of Key Stage 4 attainment (two years prior to reference year) | First attainment quintile | 13.5 | 29.5 | 27.3 | 28.9 |
| | Second attainment quintile | 18.0 | 25.5 | 21.1 | 26.2 |
| | Third attainment quintile | 20.8 | 16.0 | 19.8 | 16.9 |
| | Fourth attainment quintile | 21.9 | 14.9 | 15.3 | 15.7 |
| | Fifth attainment quintile or unknown | 25.8 | 14.1 | 16.4 | 12.3 |
| Whether the school had a vacancy | School has no vacancy | 73.0 | 67.4 | 74.7 | 66.0 |
| | School has vacancy | 27.0 | 32.6 | 25.3 | 34.0 |
| Region | East of England | 12.9 | 9.2 | 8.4 | 9.3 |
| | East Midlands | 8.7 | 9.2 | 8.3 | 8.4 |
| | West Midlands | 11.2 | 14.5 | 16.7 | 15.7 |

| Variable | | Unmatched sample proportions (%) | | Matched sample proportions (%) | |
|---|--------------------------|----------------------------------|------|--------------------------------|------|
| | | | | | |
| | Inner London | 2.4 | 7.4 | 6.9 | 6.3 |
| | Outer London | 7.2 | 12.9 | 13.1 | 13.6 |
| | North East | 4.2 | 6.8 | 7.0 | 6.9 |
| | North West | 15.2 | 10.0 | 12.7 | 10.8 |
| | South East | 19.0 | 10.5 | 10.2 | 10.8 |
| | South West | 10.0 | 10.3 | 7.4 | 8.4 |
| | Yorkshire and the Humber | 9.3 | 9.2 | 9.3 | 9.6 |
| Reference year | 2012 | 12.4 | 17.4 | 18.0 | 16.9 |
| | 2013 | 14.2 | 16.8 | 15.5 | 14.5 |
| | 2014 | 14.4 | 14.2 | 11.3 | 13.9 |
| | 2015 | 14.5 | 18.4 | 19.5 | 19.9 |
| | 2016 | 14.7 | 11.8 | 13.2 | 13.0 |
| | 2017 | 14.8 | 11.8 | 11.6 | 12.0 |
| | 2018 | 15.0 | 9.5 | 10.9 | 9.9 |
| | | | | | |
| Number of school-year combinations | | 15,219 | 380 | 1,164 | 332 |
| Proportion of sample kept | | - | - | 7.6 | 87.4 |

Note: * denotes where frequencies were rounded due to small sample sizes.

Source: NFER analysis of SWC, ITT-PP and Teach First data for 2010/11 – 2018/19.

7.4 Parallel trends assumption in difference-in-differences models

A crucial assumption which underpins the identification of all difference-in-differences models is that of parallel trends (Wooldridge, 2015). Parallel trends involves the assumption that if Teach First schools had not recruited a Teach First trainee in their 'reference year' our main outcomes (workforce characteristics, pupil attainment and university attendance) would have followed the same trajectory after the reference year as similar comparison schools. Violations of the parallel trends assumption could threaten the validity of our estimates as credible estimates of the impact of Teach First teachers.

It is not possible to directly test for the presence of a parallel trends violation. This is because it is not possible to observe a 'counterfactual' in which, in our case, Teach First schools did not recruit a Teach First trainee, and check that trends in the outcome variable were similar to comparison schools. However, it is possible to test for violations of parallel trends in the years prior to the 'reference year'. This is the approach typically adopted by other research studies which rely on difference-in-differences models.

We showed visually and conducted t-tests to determine whether parallel trends were likely to hold in each of the figures which summarised our difference-in-differences estimates in sections 4 and

5. Where estimates of the impact of a school recruiting a Teach First teacher were not statistically significantly different between Teach First and similar comparison schools, this was evidence that parallel trends were likely to hold. We also tested for parallel trends using an F-test that estimates of the impact of recruiting a Teach First trainee in the two years pre-reference year were jointly not statistically significant.

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