



**Institute for Fiscal Studies**

**Submission to the Education Select Committee**

**Christine Farquharson  
Damian Phelan  
Luke Sibieta  
Imran Tahir**

# **Teacher recruitment, training and retention: evidence to Education Committee**

# Teacher recruitment, training and retention: Evidence to Education Committee

Christine Farquharson

Damian Phelan

Luke Sibieta

Imran Tahir

---

The authors gratefully acknowledge the support of the Nuffield Foundation (grant number EDO/ FR-000022637) and the Economic and Social Research Council via the ESRC Centre for the Microeconomic Analysis of Public Policy (grant number ES/T014334/1). The Nuffield Foundation is an independent charitable trust with a mission to advance social well-being. It funds research that informs social policy, primarily in Education, Welfare and Justice. It also funds student programmes that provide opportunities for young people to develop skills in quantitative and scientific methods. The Nuffield Foundation is the founder and co-funder of the Nuffield Council on Bioethics, the Ada Lovelace Institute and the Nuffield Family Justice Observatory. The Foundation has funded this project, but the views expressed are those of the authors and not necessarily of the Foundation. Visit [www.nuffieldfoundation.org](http://www.nuffieldfoundation.org).

## Key Findings

1. Teacher salaries have declined in real-terms since 2010. Most teachers will have seen real-terms salary cuts of 13% between 2010-11 and 2022-23. This is clearly much larger than the 5% real-terms cut in average earnings over the same period. This is likely to have contributed to the significant problems in teacher recruitment and retention. Salary rises of 4.3% have been proposed for 2023-24, which will just about match expected inflation and average earnings growth, but will still leave most teacher salaries about 13% lower than in 2010.
2. Teacher starting salaries have seen more rapid increases in recent years. This reflects the government commitment to deliver £30,000 starting salaries by 2024. By 2022-23, teacher starting salaries were only 5% below their 2010 level in real-terms and are expected to be 2% lower in 2023-24.
3. Identifying the most effective teachers at hiring stage is difficult, as characteristics like qualifications, results or types of training are not strongly related to effectiveness in the classroom. Since predicting effectiveness during the hiring process is so challenging, more rigorous probation periods may be helpful in giving head teachers the chance to properly assess their staff and how they work on the job.
4. On the job, the most reliable evidence for improving teacher effectiveness supports programmes of peer-to-peer evaluation among teachers. Observing and rating two or three of a colleague's lessons substantially improved teacher effectiveness – both among the teachers receiving peer feedback and among those giving it. Teachers can also be trained in specific approaches to teaching and pedagogy.
5. Teacher attrition rates are particularly high in the early years of a teaching career. Close to a third of teachers have left the profession within their first five years. Improved rates of pay, which the Government has committed to with its promise to raise starting salaries to at least £30,000, could certainly help. However, pay is not the only important issue for retention. Teachers in England highlight a heavy workload and having to deal with disruptive pupils as significant factors too.
6. Retaining teachers in shortage subjects and in schools serving a large proportion of disadvantaged students are also pressing issues. Evidence suggests that financial

incentives, such as the levelling up premium payment, could prove effective. However, to also improve student performance it would be better to target these payments at high quality teachers.

7. Recruitment and retention issues are especially acute among teachers in the further education sector. Around 25% of college teachers leave the profession after one year compared with 15% of school teachers. Three years in, almost half of college teachers have left compared with around a quarter of school teachers.
8. On average, college teachers earn 21% less than school teachers, and the gap has grown over time. In 2010–11, the median salary (in today's prices) was around £48,000 for a school teacher and £42,500 for a college teacher. Median pay is now around £41,500 for a school teacher and £34,500 for a college teacher. Therefore, the gap in median salaries has grown from around 14% in 2010 to 21% today.
9. Developing and retaining a high-quality teaching workforce requires adequate investment in the education system. Since 2010, both schools and colleges have experienced sharp real-terms cuts to funding levels. Between 2009-10 and 2019-20, school spending per pupil in England fell by 9% in real terms, while spending per student aged 16–18 fell by 12%.

# 1. Teacher pay and recruitment

This short note sets out analysis produced by researchers at the Institute for Fiscal Studies that is relevant to the Education Committee’s inquiry into teacher recruitment, training and retention in England. We start by looking at teacher pay levels and challenges in recruiting school teachers. Section 2 examines teacher training routes, section 3 examines challenges in retention, section 4 looks at the specific challenges facing colleges and section 5 concludes.

## Teacher pay

With inflation currently around 10%, most teachers in England are experiencing real-terms pay cuts this year. This follows on from real-terms cuts dating back to 2010. This and other factors have prompted the ongoing pay dispute between teachers and the government.

In July 2022, the government accepted the most recent set of [recommendations](#) from the School Teachers Review Body (STRB). This included salary increases of 5% from September 2022 for most teachers. New and inexperienced teachers received higher increases of up to 9%, on the way to delivering a government commitment of starting salaries of £30,000 for teachers in England by 2024. These changes represent some of the biggest cash-terms increases in teacher salaries for over 15 years. However, with CPI inflation currently about 10%, these increases still represent real-terms salary cuts.

These cuts come on top of a long period of real-terms reductions in core teacher salaries dating back to 2010. As shown in Figure 1, salaries for more experienced and senior teachers have fallen by 13% in real-terms since 2010. Teachers in the middle of the salary scale have experienced cuts of 9-10% since 2010. Starting salaries have fallen by 5% in real-terms. This smaller real-terms cut to starting salaries mostly reflects faster increases for new teachers in recent years as part of a deliberate effort to increase starting salaries to £30,000.

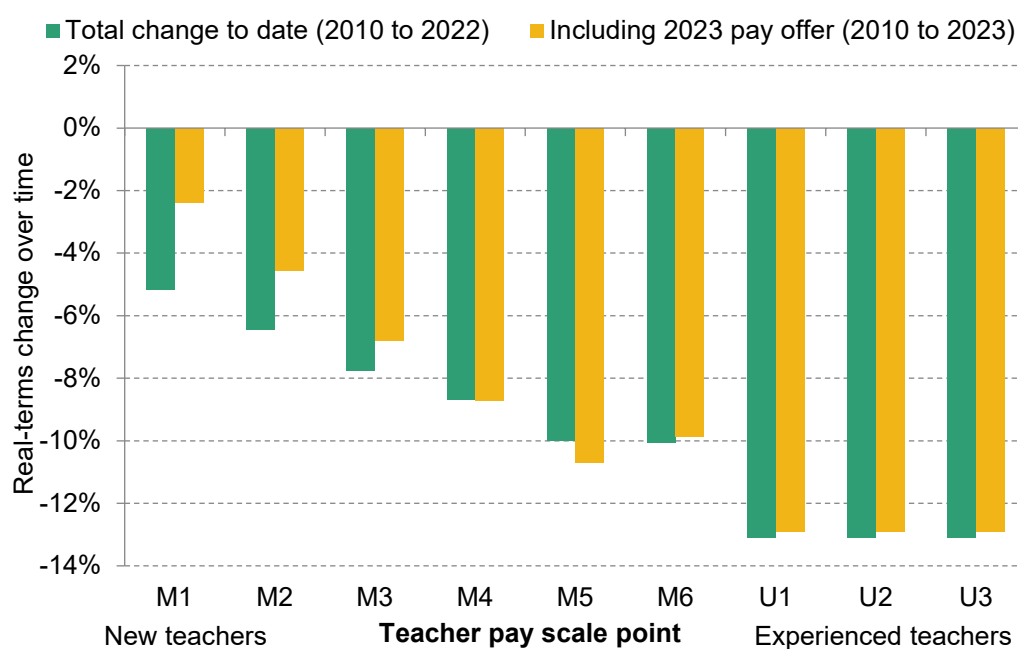
For 2022–23, the 5% increase in core teacher salaries for most teachers was below the OBR’s [estimate](#) of 5.8% for growth in average earnings. New and inexperienced teachers will be seeing pay growth in excess of this. However, the real-terms cuts in teacher pay levels in the period since 2010 compare unfavourably with changes in average earnings. Between 2010–11 and 2022–23, average earnings have fallen by about 5% in real-terms (based on whole-economy average weekly [earnings](#)). As a result, most teachers will have seen their pay levels fall relative

## 5 Teacher recruitment, training and retention: Evidence to Education Committee

to average earnings since 2010, whilst starting salaries for teachers have just about kept pace (mostly due to more recent increases).

To help interpret these changes, Table 1 shows the level of teacher salaries outside of the London area in 2010 and 2022 (both in 2022–23 prices), the changes since 2010 and the share of classroom teachers at each pay points. Teachers in the London area receive extra pay to account for a higher cost of living and some teachers receive (mostly small) payments to reflect extra responsibilities. Classroom teachers tend to move through the main pay scale relatively quickly, with over 50% of classroom teachers on the upper pay scale (U1–3 on Figure 1). This excludes school leaders, who are paid on different pay scales, but their salary scales have followed an extremely similar course to the upper pay scale. As a result, the changes in the upper pay scale are those that will apply to the majority of teachers.

**Figure 1. Real-terms changes over time in teacher core salary points since 2010: actual and proposed**



Note and source: Years refer to financial years starting each April. Teacher pay scales taken from School Teachers Pay and Conditions Document 2010 (<https://www.gov.uk/government/publications/school-teachers-pay-and-conditions>) and proposed scales from STRB report: 2022 (<https://www.gov.uk/government/publications/school-teachers-review-body-32nd-report-2022>). Real-terms value calculated based on average value of CPIH index (<https://www.ons.gov.uk/datasets/cpih01/editions/time-series/versions/11>) in the relevant financial year (e.g. 2014–15 for September 2014). Forecasts for 2022–23 and 2023–24 from OBR EFO March 2023 (CPI only), <https://obr.uk/efo/economic-and-fiscal-outlook-march-2023/#annex-a>

Table 1. Pay scales for classroom teachers in England outside of London

Pay Scale Point	2010 Base Salary (2022 prices)	2022 Base Salary (2022 prices)	Real-terms pay change since 2010	Share of classroom teachers (Nov 2020)
M1	£29,521	£28,000	-5.2%	7.4%
M2	£31,855	£29,800	-6.5%	6.4%
M3	£34,417	£31,750	-7.7%	6.3%
M4	£37,064	£33,850	-8.7%	6.0%
M5	£39,985	£35,989	-10.0%	6.4%
M6	£43,147	£38,810	-10.1%	14.6%
U1	£46,742	£40,625	-13.1%	11.7%
U2	£48,473	£42,131	-13.1%	9.9%
U3	£50,263	£43,685	-13.1%	31.2%

Source: See Figure 1 for teacher pay levels. Share of classroom teachers on each pay scale taken from DfE evidence to the STRB for 2022 (<https://www.gov.uk/government/publications/evidence-to-the-strb-2022-pay-award-for-school-staff>).

As part of the ongoing pay dispute, the government have offered teachers a one-off payment of £1,000 for 2022–23. This would be fully funded, with an extra one-off grant worth about £530 million.

For 2023–24, the government have offered most teachers salary rises of 4.3%, with higher increases for new and less experienced teachers in order to deliver starting salaries of £30,000. This makes for an average proposed increase of 4.5%. This is just above OBR forecasts of 4.1% for CPI inflation and average earnings growth in 2023–24.

Based on this offer and current inflation forecasts, Figure 1 shows that salary points for more experienced teachers in 2023–24 would still be 13% lower than in 2010. This accounts for most teachers. Larger rises in starting salaries mean that starting salaries would only be about 2% lower than in 2010 in real-terms.

In its recent [evidence](#) to the STRB, the government stated that an average offer of 3.5% would be affordable for schools. This average offer of 4.5% for teachers in 2023–24 is about 1 percentage point higher than this previous benchmark of 3.5%. The government have offered to provide additional funding to schools to cover half of this extra 1 percentage point, with schools expected to cover the extra 0.5% from within existing budgets. The government has [stated](#) that it thinks this is possible because of lower energy prices.

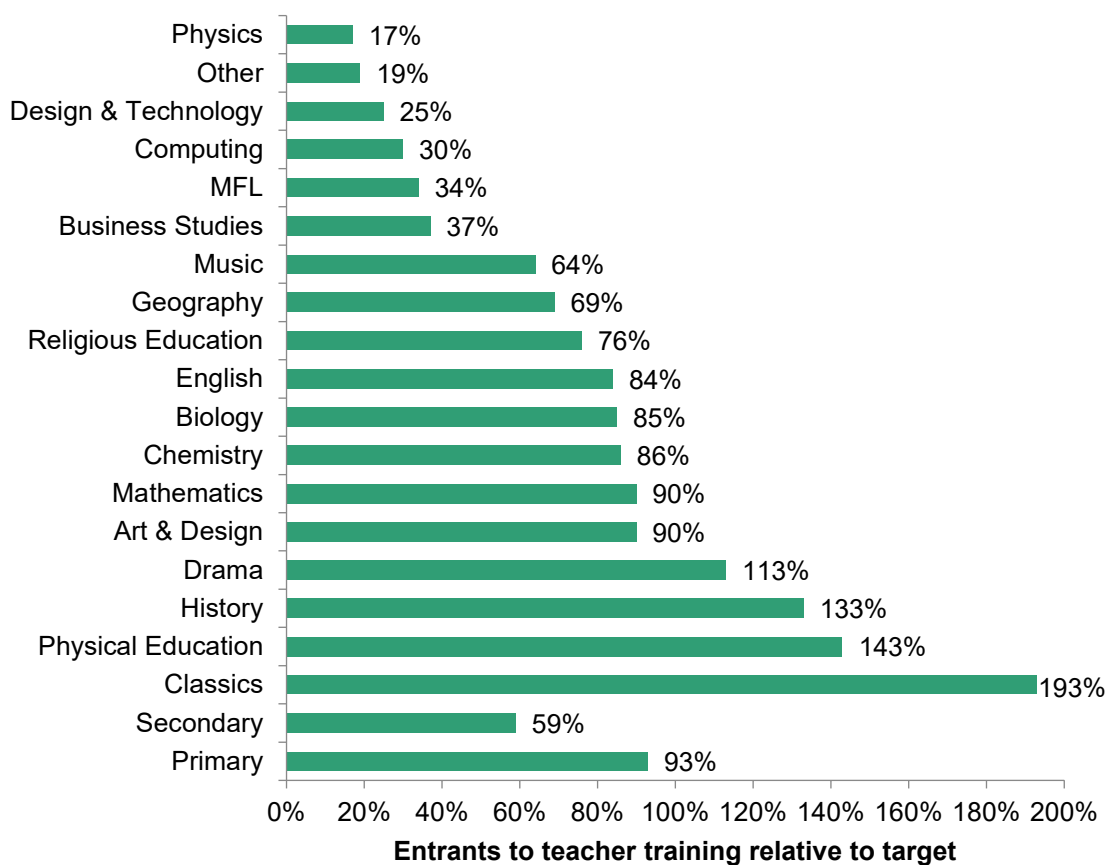
## Teacher recruitment

When it comes to teacher recruitment, the latest data paints a depressing picture. New entrants to postgraduate initial teacher training for primary schools were just below target (93%), but new secondary school trainees were a long way behind target (59%). The picture was even worse for some specific subjects, with 34% of the target achieved for modern foreign languages, 30% for computing, 25% for design and technology and a deeply worrying 17% for physics. This problem is compounded by the fact that many maths and science subjects have seen persistent recruitment and retention problems over a long period of time. This partly reflects the fact that graduates in maths and science subjects can generally command relatively high salaries in the private sector. Even more recent [data](#) shows that total applications for the next academic year (2023–24) appear just as bad as 2022–23.

When it comes to teacher retention, official [statistics](#) show that about 8% of teachers left their jobs in state-funded schools in England in the year to November 2021. Whilst this is down on the exit rate of 9-10% seen between 2015 and 2019, the lower rate of teachers leaving their job in 2021 might still reflect the difficult economic situation during the pandemic. Unfortunately, more recent official data won't become available until summer 2023. However, various [surveys](#) of schools and head teachers suggest the recruitment and retention problems facing schools have got worse this year. We also [know](#) that schools in more deprived areas face more significant problems in recruiting and retaining teachers.



Figure 2. New entrants to postgraduate initial teacher training routes in 2022–23, by subject area and relative to target



Note and source: Department for Education, [Initial teacher training: trainee number census 2022 to 2023](#), “MFL” refers to Modern Foreign Languages.

## Identifying effective teachers

Research consistently concludes that effective teaching is, by far, the most important input in pupils’ attainment. As Box 1 summarises, good teaching is vital for pupils’ outcomes.

Unfortunately, identifying strong teachers at the hiring stage is challenging: characteristics such as a candidate’s educational record or teacher training are often poor predictors of teacher effectiveness. A teacher’s level of experience can be a better guide, at least in the earliest years of teaching: effectiveness continues to increase as teachers gain more experience. On the other hand, there is some evidence that the most qualified teachers (with higher scores on licensing tests) tend to leave the profession more quickly, which acts to push down the average quality of more experienced teachers (Wiswall, 2013; Hendricks, 2016).

Once teachers are in the classroom, head teachers and policymakers have more tools available to identify the most successful teachers among a school’s existing staff, including statistical value-

added measures and direct classroom observations (Kane et al., 2011). Since predicting effectiveness during the hiring process is so challenging, more rigorous probation periods may be helpful in giving head teachers the chance to properly assess their staff and how they work on the job (as recommended by the LSE Growth Commission).

---

### **Box 1. The importance of teacher effectiveness<sup>a</sup>**

Studies from around the world consistently find that teachers differ in their average ‘effectiveness’ (the average amount of academic progress that their students make). For example, in England, Slater, Davies and Burgess (2012) find that having a teacher at the 75<sup>th</sup> rather than 25<sup>th</sup> percentile of effectiveness adds almost half of a GCSE point per subject for any given student.

The benefits of having a good teacher last in the longer term: in the U.S., Chetty, Friedman and Rockoff (2014) estimate a lifetime earnings gain of \$250,000 per classroom over a teacher’s career from replacing a teacher in the bottom 5% of value added with an average teacher. These long-run outcomes reflect not just teachers’ influence on children’s academic attainment, but also their impact on other outcomes such as behaviour and other non-cognitive skills (Jackson, 2016).

There is good evidence that differences in teacher ‘effectiveness’ persist over time, and past effectiveness is a good guide to a teacher’s performance with future classes (Kane and Staiger, 2008; Bacher-Hicks et al., 2019). That means that, year after year, the most effective teachers see the pupils in their classes make faster-than-average progress, and these pupils are likely to go on to enjoy higher lifetime earnings.

<sup>a</sup> Adapted from Farquharson, McNally and Tahir (2022).

---

## 2. Teacher training

### Initial teacher training

There are a number of routes into teaching. Most primary and secondary teachers are trained through the Postgraduate Certificate in Education (PGCE) or the Bachelor of Education (BEd), both led by higher education institutions. A smaller share come through programmes like Teach First or school-based training routes (which place trainees into schools). For schools, the latter routes imply both costs (e.g., staff time for supervision of a trainee) and benefits (e.g., from new ideas and contributions from the trainee).

IFS research concluded that schools felt the net benefits were highest for trainees from Teach First, with lower net benefits from higher education institution-led training programmes (Allen et al., 2014). Subsequent research found that the presence of trainee teachers in schools does not significantly affect pupils' attainment (Greaves, Belfield and Allen, 2019).

### Management and CPD

Because teachers play a vital role, good management and feedback to help them develop is essential to effective education. In one experiment, for example, school principals who were given management training and encouraged to give frequent detailed feedback to teachers saw test scores in their schools rise by around 30% of a standard deviation (Fryer, 2017). A number of other studies also highlight the importance of good management practices for attainment (Bloom et al., 2015; Muñoz and Prem, 2022). This is also important for students in further education colleges (McNally, Schmidt and Valero, 2022).

Teaching can also be improved among the existing pool of teachers. The most reliable evidence supports programmes of peer-to-peer evaluation among teachers. For example, Burgess, Rawal and Taylor (2021) find that assigning teachers to observe and rate two or three of a colleague's lessons substantially improved teacher effectiveness – both among the teachers receiving peer feedback and among those giving it.

Teachers can also be trained in specific approaches to teaching. For example, Machin and McNally (2008) and Machin, McNally and Viarengo (2018) show that training teachers to adopt more effective teaching strategies for literacy delivered long-lasting benefits among boys and pupils from disadvantaged backgrounds.

## 3. Teacher retention

English schools have faced serious issues with teacher retention for most of the past decade. Although there have been some recent improvements, it is still the case that 1 in 5 newly qualified teachers has left the profession within their first two years of teaching, and almost 1 in 3 within their first five years. On a more positive note, 3 in 5 teachers who qualified ten years ago are still working as teachers.

These figures suggest that there are particularly high rates of attrition in the early years of a teaching career and that it would therefore be appropriate to target intervention at that stage. Indeed, the government's ambition to raise teacher starting salaries to £30,000 is aimed at boosting the pay of less experienced teachers, which may help with retention during their initial years in the profession (Hendricks, 2014; Fullard, 2021).

However, pay is certainly not the only issue, and not necessarily the most important issue, when it comes to teacher retention. Two extensive surveys of English teachers (TALIS, 2018; Burge et al, 2021) highlight that workload and the nature of the teaching environment hold significant weight when teachers are deciding whether to remain in the profession. English teachers work some of the longest hours among teachers in the OECD countries and consider they spend long periods on marking and other administrative tasks (TALIS, 2018).

Disruptive behaviour from students also plays a significant role. To move from a low disruptive environment to a highly disruptive one, teachers would, on average, demand a 26% increase in their annual pay (Burge et al, 2021). This suggests that teachers place considerable value on working in a pleasant environment where they feel they are having an impact. A study by Loeb et al (2012) provides support for this, showing that more effective schools (in the sense that pupils make more than expected progress by attending these schools) are better able to retain higher quality teachers. These schools are also better able to attract more effective teachers from other schools.

### Teacher retention in shortage subjects

Challenges with teacher retention are particularly acute for shortage subjects. For subjects such as physics, maths, chemistry and computing, a significant issue is that the median salary for graduates of those subjects is substantially higher working outside of teaching. However, this is not the case for all shortage subjects. Retention rates for teachers of modern foreign languages

are similarly poor despite the fact that median earnings are better in teaching than outside. Three studies from the United States indicate that financial incentives could positively impact retention rates (Clotfelter et al, 2009; Feng and Sass, 2016; Bueno and Sass, 2016). According to Sims (2017) these studies show that a 1% increase in pay leads to a 3.1% reduction in teachers leaving the profession. This suggests that the Government's levelling up premium payment for teachers of maths, chemistry, physics and computing, which provides an annual payment of between £1,500 and £3,000, dependent on the local authority in which a teacher works, could yield positive results.

## Teacher retention in schools serving disadvantaged pupils

In terms of improving retention in schools serving disadvantaged populations, financial incentives have also been shown to be effective (Clotfelter et al, 2011). However, a key question is whether these incentives also lead to improved teacher quality and therefore student performance in these schools. Research suggests that these payments are most effective when they are targeted at teachers with a record of excellent performance (Swain et al, 2018; Morgan et al, 2023).

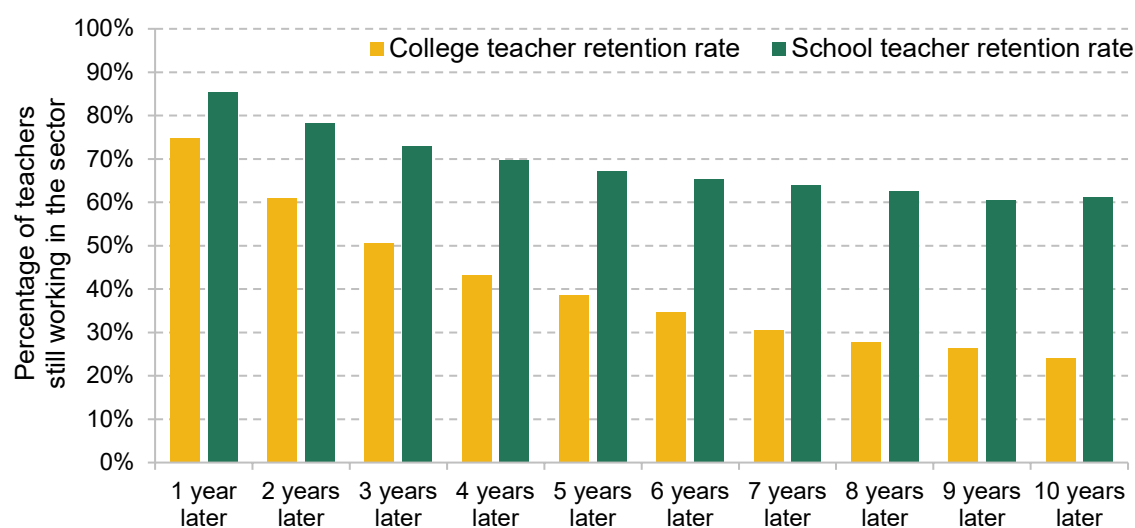
Retention of teachers is a pressing issue for the Government and while pay is a significant driver in a teacher's decision to remain in the profession, it is certainly not the only relevant factor. Workload and the teaching environment play significant roles too. Keeping shortage subject teachers in the profession also must be a priority, alongside encouraging excellent teachers to remain in schools where pupils need them most.

## 4. Challenges facing colleges

Many of the recruitment and retention problems present among the school workforce are also evident, and often more acute, among the college workforce. In England, there are around 50,000 teachers in further education (FE) colleges who mainly teach vocational qualifications to young people and adults; they teach a wide range of subject areas, from basic literacy to childcare, catering and engineering. The college workforce plays a crucial role in providing young people and adults with skills they need to succeed in the labour market, which is a key reason why high turnover within this sector is especially concerning.

Figure 3 shows that college teachers are far more likely to leave the profession than school teachers. After one year, around 25% of college teachers have left the profession compared with 15% of school teachers. Three years in, almost half of college teachers have left compared to around a quarter of school teachers. What is particularly striking is that while the share of school teachers remaining in the profession begins to plateau after five years, the share of college teachers continues to fall. Less than a quarter of college teachers remain in the profession ten years after they begin teaching.

**Figure 3. Teacher retention for colleges and schools**



Source: Figure 6, Sibieta and Tahir (2023). Author's calculations using [Further education college workforce analysis: tables](#) and [School workforce in England](#).

Note: The chart shows teacher retention rates in 2019, i.e., the retention rates for 1 year later correspond to teachers who began in 2018, while the retention rates for 2 years later correspond to teachers who began in 2017 and so on.

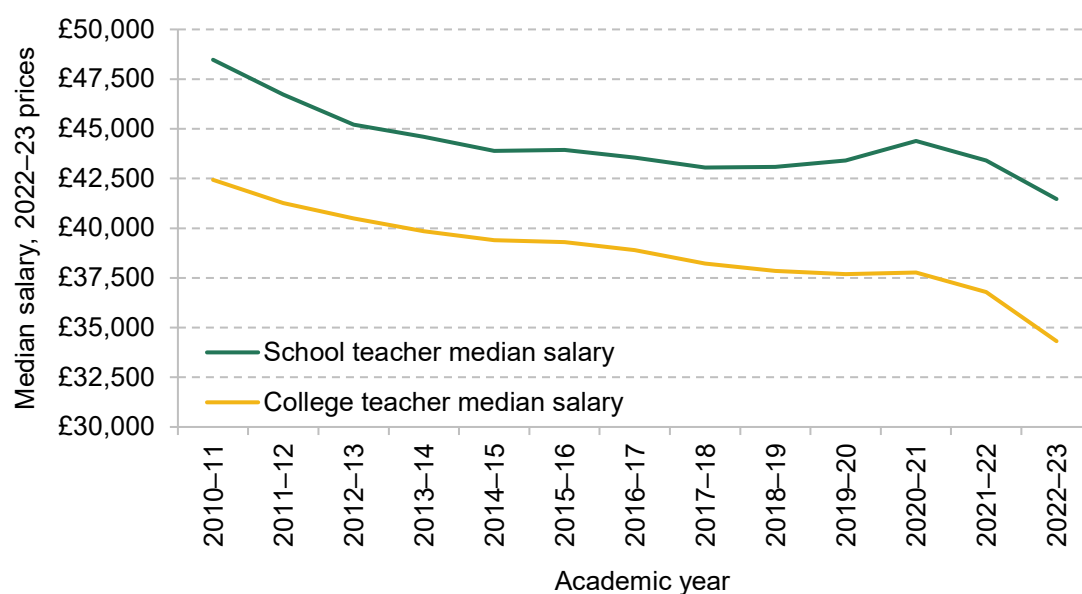
The persistent departure of college staff means that there is not a stable core of experienced teachers. As a result, young people and adult learners at colleges are often taught by inexperienced teachers. For college leaders, there is a continual need to recruit new staff to fill vacancies, which is especially difficult at present given high vacancy rates across the economy.

There are likely to be many factors contributing to low retention rates among college teachers. One major factor is their workload. Survey evidence collected by the UCU (2022) found that 42% of college staff found their workload ‘unmanageable’ with 93% of college staff stating that their workload had increased over the past 3 years. Another key factor that is likely to be driving especially low retention levels among college teachers is pay levels.

Figure 2 shows that college teachers earn less on average than school teachers and this gap has grown over time. In 2010–11, the median salary (in today’s prices) stood at around £48,500 for a school teacher and £42,500 for a college teacher – a gap of about 14% in terms of college teacher pay. Between 2010–11 and 2022–23, the median salary for a school teacher fell by 14%, while the median salary for a college teacher fell by 19%.

The median salary for a college teacher is currently around £34,500 compared to £41,500 for a school teacher. That means college teachers currently earn £7,000 (or 21%) less on average than school teachers. This is the largest salary gap since at least 2010–11 and possibly much earlier.

**Figure 4. Median salary for college and school teachers in England**



Source: Figure 4, Sibieta and Tahir (2023). Author’s calculations using [Further education college workforce analysis: tables](#), [English FE pay scales](#), [School workforce in England](#) and [School Teachers’ Review Body pay recommendations](#).

College leaders face the challenge of finding money within already stretched budgets to fund pay increases for their staff. Between 2009-10 and 2019–20, public spending per student aged 16–18

declined by 12% in colleges in real terms, while spending on classroom-based adult education almost halved (Drayton et al, 2022). These cuts to the post-16 education budget have made it difficult for college leaders to allocate more money to higher pay levels.

Although additional funding has been allocated in recent spending reviews, this only partially reverses the cuts that took place up to 2020. Moreover, unlike schools, post-16 education did not receive extra funding in the 2022 Autumn Statement; colleges also did not receive additional support in the Spring Budget to help meet rising cost pressures. As a result, the immediate prospects for improving recruitment and retention among the college workforce appear gloomy.



## 5. Conclusions

Schools and colleges across England are experiencing severe issues with recruitment and retention. Teacher training targets have been persistently missed over time. These recruitment issues are especially acute in shortage subjects, such as STEM-based subjects. Once teachers have been recruited, there is also the challenge of retaining them. Currently, 1 in 5 newly-qualified school teachers leave the profession within their first two years of teaching, and almost 1 in 3 within their first five years. The picture is even worse in the further education sector where almost a quarter of college teachers leave after one year and half have left within 3 years.

Improving teacher recruitment and retention is challenging, because there are multiple factors that influence an individual's choice to enter the teaching profession and then to remain a teacher. One key factor is pay. Teachers have experienced large real-terms declines in their pay levels over the last decade. Since 2010, the median salary for a school teacher fell by 14% and by 19% for college teachers, and there have been especially sharp real-terms falls in the past couple of years due to large gaps between recommended pay awards and inflation.

Teacher pay is clearly not the only relevant issue, and academic evidence shows the importance of many other factors for developing a high-quality teaching workforce. In general, it is difficult to identify which individuals will make the most effective teachers at the hiring stage, which points to the need for more robust probationary periods as well as continual professional development. On the latter, there is reliable evidence that programmes of peer-to-peer evaluation among teachers are an effective tool for improving teacher effectiveness.

Ultimately, schools and colleges need sufficient resources to meet these challenges. Between 2009-10 and 2019-20, schools and colleges faced sharp real-terms cuts to funding levels. Additional funding in recent years should restore funding levels in schools back to previous levels, but colleges will still be well below 2010-levels. This makes it challenging for school leaders, and particularly college leaders, to take the necessary actions to improve recruitment, training and retention.

# References

- Aghion, P., Besley, T., Browne, J., Caselli, F., Lambert, R., Lomax, R., Pissarides, C., Stern, N., and Van Reenen, J. (2013), 'Investing for Prosperity: Skills, Infrastructure and Innovation', LSE Growth Commission, <https://cep.lse.ac.uk/LSE-Growth-Commission/publications.asp>.
- Allen, R., and Allnutt, J. (2017), 'The Impact of Teach First on Pupil Attainment at Age 16', *British Educational Research Journal*, 43(4), 627–46. Accessed online: <https://bera-journals.onlinelibrary.wiley.com/doi/abs/10.1002/berj.3288>.
- Allen, R., Belfield, C., Greaves, E., Sharp, C., and Walker, M. (2016), 'The Longer-Term Costs and Benefits of Different Initial Teacher Training Routes', Institute for Fiscal Studies (IFS), Report 118, <https://ifs.org.uk/publications/8368>.
- Allen, R., Belfield, C., Greaves, E., Sharp, C. and Walker, M. (2014), 'The costs and benefits of different initial teacher training routes', Institute for Fiscal Studies (IFS), Report 100, <https://ifs.org.uk/publications/costs-and-benefits-different-initial-teacher-training-routes>.
- Bacher-Hicks, A., Chin, M. J., Kane, T. J., and Staiger, D. O. (2019), 'An Experimental Evaluation of Three Teacher Quality Measures: Value-Added, Classroom Observations, and Student Surveys', *Economics of Education Review*, 73. Accessed online: <https://www.sciencedirect.com/science/article/abs/pii/S0272775719302717?via%3Dihub>.
- Bloom, N., Lemos, R., Sadun, R., and Van Reenen, J. (2015), 'Does Management Matter in Schools?', *Economic Journal*, 125(584), 647–74.
- Bueno, C. and Sass, T. (2016), 'The effects of differential pay on teacher recruitment, retention and quality'. In 2016 Fall Conference: The Role of Research in Making Government More Effective.
- Burge, P., Hui L., and Phillips, W.D., (2021) 'Understanding Teaching Retention: Using a discrete choice experiment to measure teacher retention in England', RAND Corporation, RR-A181-1, 2021. Accessed online: [https://www.rand.org/pubs/research\\_reports/RRA181-1.html](https://www.rand.org/pubs/research_reports/RRA181-1.html)
- Burgess, S. (2019), 'Understanding Teacher Effectiveness to Raise Pupil Attainment', IZA World of Labor, article 465, <https://wol.iza.org/articles/understanding-teacher-effectiveness-to-raise-pupil-attainment/long>.
- Burgess, S., Rawal, S., and Taylor, E. S. (2021), 'Teacher Peer Observation and Student Test Scores: Evidence from a Field Experiment in English Secondary Schools', *Journal of Labor Economics*, 39(4), 1155–86.

## 18 Teacher recruitment, training and retention: Evidence to Education Committee

- Chetty, R., Friedman, J. N., and Rockoff, J. E. (2014), 'Measuring the Impacts of Teachers II: Teacher Value Added and Student Outcomes in Adulthood', *American Economic Review*, 104(9), 2633–79. Accessed online: <https://www.aeaweb.org/articles?id=10.1257/aer.104.9.2633>.
- Clotfelter, C., Glennie, E., Ladd, H., & Vigdor, J. (2008), 'Would higher salaries keep teachers in high-poverty schools? Evidence from a policy intervention in North Carolina'. *Journal of Public Economics*, 92 (5), 1352–1370.
- Clotfelter, C. T., Ladd, H. F., and Vigdor, J. L. (2010), 'Teacher Credentials and Student Achievement in High School: A Cross-Subject Analysis with Student Fixed Effects', *Journal of Human Resources*, 45(3), 655–81. Accessed online: <http://jhr.uwpress.org/content/45/3/655.refs>.
- Clotfelter, C.T., Ladd, H.F. and Vigdor, J.L. (2011), 'Teacher mobility, school segregation, and pay-based policies to level the playing field'. *Education Finance and Policy*, 6(3), pp.399-438.
- Drayton, E., Farquharson, C., Ogden, K., Sibieta, L., Tahir, I. and Waltmann, B., 2022. Annual report on education spending in England: 2022. IFS Report R234, <https://ifs.org.uk/publications/annual-report-education-spending-england-2022>.
- Farquharson, C., McNally, S. and Tahir, I. (2022), 'Education Inequalities', IFS Deaton Review of Inequalities, <https://ifs.org.uk/inequality/education-inequalities/>.
- Feng, L., & Sass, T. R. (2016). 'The Impact of Incentives to Recruit and Retain Teachers in "Hard-to-Staff" Subjects'. Working Paper 141, National Center for Analysis of Longitudinal Data in Education Research.
- Fullard, J. (2021), 'Relative wages and pupil performance, evidence from TIMSS (No. 2021-07)'. ISER Working Paper Series.
- Fryer, R. G. (2017), 'Management and Student Achievement: Evidence from a Randomized Field Experiment', National Bureau of Economic Research (NBER), Working Paper 23437, <https://www.nber.org/papers/w23437>.
- Hendricks, M. (2014), 'Does it pay to pay teachers more? Evidence from Texas.' *Journal of Public Economics*, 109, pp.50-63.
- Hendricks, M. (2016), 'Differential Teacher Attrition: Do High-Ability Teachers Exit at Higher Rates?'. Available at SSRN 2824586.
- Jackson, C. K. (2016), 'What Do Test Scores Miss? The Importance of Teacher Effects on Non-Test Score Outcomes', National Bureau of Economic Research (NBER), Working Paper 22226.
- Kane, T. J., and Staiger, D. O. (2008), 'Estimating Teacher Impacts on Student Achievement: An Experimental Evaluation', National Bureau of Economic Research (NBER), Working Paper 14607.

## 19 Teacher recruitment, training and retention: Evidence to Education Committee

- Kane, T. J., Taylor, E. S., Tyler, J. H., and Wooten, A. L. (2011), 'Identifying Effective Classroom Practices Using Student Achievement Data', *Journal of Human Resources*, 46(3), 587–613. Accessed online: <http://jhr.uwpress.org/content/46/3/587.refs>.
- Loeb, S., Kalogrides, D. and Bêteille, T., (2012), 'Effective schools: Teacher hiring, assignment, development, and retention'. *Education Finance and Policy*, 7(3), pp.269-304.
- Machin, S., and McNally, S. (2008), 'The Literacy Hour', *Journal of Public Economics*, 92, 1441–62.
- Machin, S., McNally, S., and Viarengo, M. (2018), 'Changing How Literacy Is Taught: Evidence on Synthetic Phonics', *American Economic Journal: Economic Policy*, 10(2), 217–41.
- McNally, S., Schmidt, L., and Valero, A. (2022), 'Do Management Practices Matter in Further Education?', Centre for Vocational Education Research (CVER), Discussion Paper 036.
- Morgan, A.J., Nguyen, M., Hanushek, E.A., Ost, B. and Rivkin, S.G. (2023). 'Attracting and Retaining Highly Effective Educators in Hard-to-Staff Schools' (No. w31051). National Bureau of Economic Research.
- Muñoz, P., and Prem, M. (2022), 'Managers' Productivity and Recruitment in the Public Sector: The Case of School Principals', Working Paper, <https://osf.io/preprints/socarxiv/7zn2b/>.
- OECD (2019), 'TALIS 2018 Results (Volume I): Teachers and School Leaders as Lifelong Learners', TALIS, OECD Publishing, Paris. Accessed online: <https://doi.org/10.1787/1d0bc92a-en>.
- Sibieta, L. and Tahir, I., 2023. What has happened to college teacher pay in England? IFS Report R254, <https://ifs.org.uk/publications/what-has-happened-college-teacher-pay-england>.
- Sims, S., (2017), 'What happens when you pay shortage-subject teachers more money? Simulating the effect of early-career salary supplements on teacher supply in England'. Gatsby Charitable Foundation. Accessed online: <https://discovery.ucl.ac.uk/id/eprint/10086518/1/datalab-simulating-the-effect-of-early-career-salary-supplements-on-teacher-supply-in-england.pdf>
- Slater, H., Davies, N. M., and Burgess, S. (2012), 'Do Teachers Matter? Measuring the Variation in Teacher Effectiveness in England', *Oxford Bulletin of Economics and Statistics*, 74(5), 629–45. Accessed online: <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1468-0084.2011.00666.x>.
- Swain, W.A., Rodriguez, L.A. and Springer, M.G. (2019), 'Selective retention bonuses for highly effective teachers in high poverty schools: Evidence from Tennessee'. *Economics of Education Review*, 68, pp.148-160.
- UCU (2022) University & College staff do two days unpaid work every week, UCU. Available at: <https://www.ucu.org.uk/article/12347/University--college-staff-do-two-days-unpaid-work-every-week>.

Wiswall, M. (2013), 'The Dynamics of Teacher Quality', *Journal of Public Economics*, 100, 61–78. Accessed online: <https://www.sciencedirect.com/science/article/abs/pii/S0047272713000194>.