

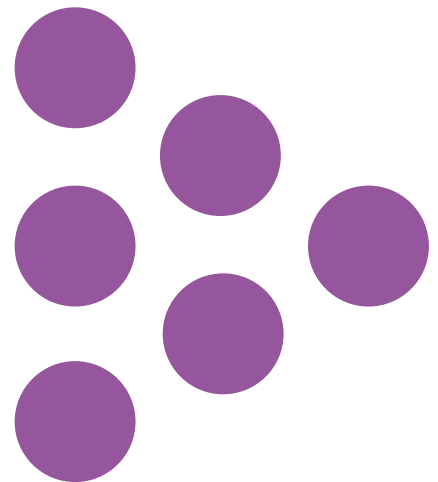
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**Technical appendix**

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**Methodology appendix - Teacher Labour  
Market in England: Annual Report 2020**

**National Foundation for Educational Research (NFER)**



# Methodology Appendix – Teacher Labour Market in England: Annual Report 2020

Jack Worth

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## 1 Introduction

This methodology appendix explains the data we use to inform our analysis of the Teacher Labour Market in England.

- Section 2 describes the data sources that we used, including the two household survey datasets – the Labour Force Survey (LFS) and the UK Household Longitudinal Study (UKHLS) – that we use to measure teachers’ (and similar professionals’) working conditions.
- Section 3 explains our methodology for identifying teachers in these two household survey datasets.
- Section 4 explains our methodology for identifying groups of similar professionals, by matching their characteristics to the samples of teachers.
- Section 5 explains some details of the analysis we undertake on teacher working conditions and shows the underlying sample sizes.
- Section 6 describes the different measures we use to describe the current state of recruitment, retention and shortages in the English teacher labour market.
- Section 7 describes the different measures we use to describe teachers’ (and similar professionals’) working conditions.

An accompanying spreadsheet presenting additional data and, where not presented in the report, breakdowns by primary and secondary teachers, is available at [www.nfer.ac.uk/tlm2020](http://www.nfer.ac.uk/tlm2020).

## 2 Data Sources

The following data sources were used to inform this research report:

- Initial Teacher Training: Trainee Number Census and Teacher Supply Model. Available: <https://www.gov.uk/government/collections/statistics-teacher-training>
- School Workforce in England. Available: <https://www.gov.uk/government/collections/statistics-school-workforce>
- Teacher Regulation Agency Annual Report. Available: <https://www.gov.uk/government/publications/teaching-regulation-agency-annual-report-and-accounts-2018-to-2019>
- Schools, pupils and their characteristics. Available: <https://www.gov.uk/government/collections/statistics-school-and-pupil-numbers>
- Labour Force Survey. Available from UK Data Service. More information: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/methodologies/labourforcesurveyuserguidance>
- UK Household Longitudinal Study (Understanding Society). Available from UK Data Service. More information: <https://www.understandingsociety.ac.uk/>

### 3 Defining teachers in household survey datasets

In the LFS and UKHLS data, we define our sample of teachers as: teachers employed in England’s state-funded primary and secondary schools. Specifically we define our sample as:

- Industry = ‘Primary education’ or ‘General secondary education’
- Occupation = ‘Primary and nursery education teaching professionals’ or ‘Secondary education teaching professionals’ or ‘Special needs education teaching professionals’ or ‘Senior professionals of educational establishments’
- Country of work = ‘England’
- Sector = ‘Public’.

We specifically *exclude* from our definition the following occupations:

- ‘Teaching and Educational Professionals not elsewhere classified’, which includes adult education tutors, education consultants and private tutors
- ‘Education advisers and school inspectors’
- ‘Higher education teaching professionals’
- ‘Further education teaching professionals’.

### 4 Methodology for identifying similar professionals

The aim of our analysis of teachers’ working conditions is three-fold. We seek to measure how:

1. teachers’ working conditions have changed over time
2. teachers’ working conditions compare to those in other professions
3. the difference in working conditions between teachers and other professionals has changed over time.

Comparing teachers to all employees in professional occupations in a meaningful way is challenging because the two groups are likely to differ in a number of important ways. For example, they may be different because people with different characteristics or motivations select to go into different occupations. No comparison of different occupations should therefore be interpreted as the effect of entering that profession, although working conditions, and employees’ perceptions of them, can be influenced by entering that occupation rather than another.

We aim to improve the comparability of our analysis as much as we can. Instead of comparing all teachers to all employees in professional occupations, we analyse a group of professionals with similar characteristics to teachers. The group includes professionals from the private and public sector, including scientists, researchers, engineers, IT professionals, health and nursing professionals, lawyers, accountants, statisticians, economists, social workers, librarians, and journalists. We use an identical methodology for our comparisons using the LFS and UKHLS data.

First, we identify all individuals across all years coded as having a professional occupation according to their Standard Occupational Classification (SOC) code. We use the SOC 2010 definition in the LFS. For the UKHLS data, occupations in early waves were only coded with SOC

2000 codes. Occupations coded in SOC 2010 codes were only available in later waves, and only for those who had changed occupation. We therefore amend the SOC 2000 codes to match the definitions used in SOC 2010 as far as possible, for consistency with the LFS. We do this by using a subset of individuals for whom we have occupation according to both codes.

Specifically, we reassign any non-professional occupational group (according to its SOC 2000 definition) to be in our definition of professionals if at least 85 per cent of individuals within that group were defined, according to the SOC 2010 definition, as being a professional. This included 'Information and communications technology managers', 'Quality assurance managers', 'Nurses', 'Midwives', 'Medical radiographers', 'Chiropodists', 'Physiotherapists', 'Occupational therapists', 'Speech and language therapists', 'Journalists, newspaper and periodical editors' and 'Conservation and environmental protection officers'. We remove those employed in the wider education sector, and those employed outside England from the 'professionals' group.

Second, we re-weight the 'other professionals' group so that the distribution of gender, age, region and highest qualification is the same among the teachers and the group of 'other professionals'. We use a technique called *entropy balancing*, to re-weight the 'other professionals' group within each wave and derive a 'similar professionals' group (Hainmueller, 2012). This re-weighting approach does not remove all the underlying differences in characteristics and motivations between teachers and 'other professionals'. However, it minimises the risk that any observed differences in working conditions are driven by differences in the distribution of gender, age, region and highest qualification between the two groups.

We also separately derive a set of matched sub-groups for further analysis. These include a group of professionals matched to all primary teachers, all secondary teachers, all full-time teachers, full-time primary teachers and full-time secondary teachers. The professionals all have slightly different analysis weights to ensure the group as a whole has similar characteristics to that which it is matching.

## 5 Analysis and sample sizes

### 5.1 LFS data

We conduct the analysis using an approximation to an academic year, combining the four quarterly datasets from the beginning of July to the end of the following June. We use the cross-sectional analysis weights provided in the data set. This ensures the analysis is representative of UK households, and therefore by extension, of English teachers in the state-sector.

The sample sizes used in the LFS analysis are shown in Table 1. Sample sizes for each individual measure will differ, depending on the extent of missing data for each measure and the sample used for analysis (e.g. full-time only will have a smaller sample size). These are reported in the separate data appendix.

**Table 1 Sample sizes for LFS analysis**

Year	Sample size of teachers	Sample size of similar professionals
2010/11	4,279	19,547
2011/12	4,113	23,339
2012/13	3,970	23,384
2013/14	3,961	24,119
2014/15	3,852	23,408
2015/16	3,828	23,061
2016/17	3,452	22,772
2017/18	3,367	22,858
2018/19	3,199	22,598

Source: Labour Force Survey.

## 5.2 UKHLS data

We conduct the UKHLS analysis using academic years, which we identify using interview dates. The data is collected in overlapping waves, which last just over two years. The analysis therefore cuts across the wave structure of the study design. We analyse all currently available data, which is from waves 1-9. An implication of this for the analysis is that estimates for 2017/18 are provisional, pending further data that was collected early in wave 10. The full set of wave 10 data will be available in November 2020.

We use cross-sectional analysis weights provided as part of the UK Data Service extract. This ensures the analysis is representative of UK households, and therefore by extension, of English teachers in the state-sector.

The sample sizes used in the UKHLS analysis are shown in Table 2. Sample sizes for each individual measure will differ slightly, depending on the extent of missing data for each measure and the sample used for analysis (e.g. full-time only will have a smaller sample size). These are reported in the separate data appendix. The sample sizes in both groups have fallen over time due to longitudinal attrition, while the estimates for 2017/18 have a lower sample size as they do not yet include data from wave 10, and are therefore provisional.

**Table 2 Sample sizes for UKHLS analysis**

Year	Sample size of teachers	Sample size of similar professionals
2010/11	650	2,235
2011/12	601	1,982
2012/13	573	1,982
2013/14	520	1,821
2014/15	527	1,758
2015/16	525	1,981
2016/17	454	1,713
2017/18	271	1,070

Note: Estimates for 2017/18 are provisional: they are based on reduced sample sizes, which will be enhanced with data from wave 10 published in November 2020.

Source: UK Household Longitudinal Study.



## 6 Teacher recruitment, retention and supply measures

### Postgraduate teacher training entries vs target

*Sources: ITT Census and Teacher Supply Model.* Number of postgraduate teacher training entries by phase and the target number of teacher trainees required to meet teacher demand, as estimated by the Teacher Supply Model. Forecasts of future entrant need are estimates from the 2020/21 Teacher Supply Model. Note: Teach First trainees are included in the ITT census numbers and targets from 2015/16 onwards.

### Rate of teachers leaving state-sector teaching

*Source: School Workforce in England: November 2018 (Table 7b).* The rate of teachers leaving the state sector by phase. This includes working-age teachers leaving teaching in the state sector and retiring teachers. However, teachers who are counted as having left could still be teaching in another country, in further education or in the independent sector. The leaver figures from 2018 (including recalculated estimates for previous years) are not comparable to previous published information, due to changes to the DfE methodology used to calculate leaver numbers. Full details of the methodology change are explained in the DfE’s accompanying methodology document.

### Teachers returning to the state sector

*Source: School Workforce in England: November 2018 (Table 7a).* The number of teachers returning to the state sector: starting a role in the state sector, having previously held a role in a state sector school. DfE has not recently published data on the number of returners split by phase. The entrant figures from 2018 (including recalculated estimates for previous years) are not comparable to previous published information, due to changes to the DfE methodology used to calculate entrant numbers. Full details of the methodology change are explained in the DfE’s accompanying methodology document.

### QTS awards for overseas-trained teachers

*Source: Teacher Regulation Agency Annual Report 2018 to 2019.* Number of Qualified Teacher Status (QTS) awards to teachers trained overseas. The figure does not measure the number of teachers gaining QTS by transfer and then entering teaching in the state sector: this would be lower than the number of QTS awards as not all awards result in a teacher entering the state sector.

### EEA and non-EEA nationals training within the English ITT system

*Source: ITT Census (Tables 9 and 9b).* Numbers of EEA and non-EEA nationals on postgraduate ITT courses. Note that figures for 2019/20 are provisional and are subject to change.

### Average class sizes

*Source: Schools, pupils and their characteristics: January 2019 (Table 7a).* The data is collected as part of the School Census in January each year.

### **Vacancies and temporarily-filled posts**

*Source: School Workforce in England: November 2018 (Table 14).* Advertised vacancies for full-time permanent appointments (or appointments of at least one term's duration) that are open in November. The data does not count vacancies that have been filled during the previous recruitment cycle. Vacancies being filled on a temporary basis are less than one term. Weighted averages for primary and secondary are derived from within-phase breakdowns of LA maintained and Academy data on vacancies and FTE teacher numbers from Table 1.

### **Net reduction in the proportion of NQT cohort still in service in state-sector teaching**

*Source: School Workforce in England: November 2018 (Table 8).* For each qualifying cohort of new teachers, we measure the net change in the proportion that are in service from one year to the next. For example, 85.1 per cent of the cohort that qualified and entered service in 2016 were still in service in November 2017 and 77.5 per cent were in service in November 2018. Therefore, between their second year and third year, the proportion of the cohort in service reduced by 7.6 percentage points. The measure is not a 'leaving rate': while it includes teachers from the cohort of NQTs who left in that year, it also nets out those from the cohort who return to, or enter, service in that year. The retention figures from the 2018 data (including recalculated estimates for previous years) are not comparable to previous published information, due to changes to the DfE methodology used to calculate retention numbers. Full details of the methodology change are explained in the DfE's accompanying methodology document.

### **Postgraduate teacher training entries vs target, by subject**

*Sources: ITT Census (Table 1c).* Number of postgraduate teacher training entries by secondary subject as a proportion of the target number of teacher trainees required to meet teacher demand in that subject, as estimated by the Teacher Supply Model. Note: Teach First trainees are included in the ITT census numbers and targets from 2015/16 onwards.

### **Vacancies and temporarily-filled posts, by subject**

*Source: School Workforce in England: November 2018 (Table 15).* Advertised vacancies for full-time permanent appointments (or appointments of at least one term's duration) that are open in November. The data does not count vacancies that have been filled during the previous recruitment cycle. Vacancies being filled on a temporary basis are less than one term. The denominator for the vacancy rate is full-time qualified regular teachers in (or on secondment from) state funded secondary schools.

## 7 Teacher working conditions measures

### Full-time working hours in a normal week

*Source: LFS.* Average (mean) response to ‘Thinking of your (main) job/ business, how many hours per week do you usually work – please exclude meal breaks?’ Full-time teachers and similar professionals only.

### Proportion full-time wanting to work fewer hours

*Source: LFS.* The measure is derived from a combination of responses and routed questions - see LFS user guide for details. Proportion of respondents: ‘Would you rather work shorter hours than in your present job?’ Full-time teachers and similar professionals only.

### Proportion with low leisure time satisfaction

*Source: UKHLS.* Proportion of respondents who selected 1 (Completely dissatisfied), 2 (Mostly dissatisfied) or 3 (Somewhat dissatisfied): ‘On a scale of 1 to 7 where 1 = ‘Completely Dissatisfied’ and 7 = ‘Completely Satisfied’, please tell me the number which you feel best describes how dissatisfied or satisfied you are with the following aspects of your current situation: the amount of leisure time you have’. Full-time teachers and similar professionals only.

### Professional autonomy

*Source: UKHLS.* Average (mean) response for the respondent across four sub-questions, where 4=A lot, 3=Some, 2=A little and 1=None: ‘In your current job, how much influence do you have over... [What tasks you do in your job/ The pace at which you work/ How you do your work/ The order in which you carry out tasks]’.

### Median full-time annual gross salary (2018/19 prices)

*Source: LFS.* Survey question: ‘What would be your usual gross pay for the last [period]?’ Gross weekly pay is a derived variable - see LFS user guidance for how this is constructed. We multiply by 52.1 to derive annual gross pay. Pay has been inflated to January 2019 prices using the quarterly consumer prices index. Full-time teachers and similar professionals only.

### Proportion with low income satisfaction

*Source: UKHLS.* Proportion of respondents who selected 1 (Completely dissatisfied), 2 (Mostly dissatisfied) or 3 (Somewhat dissatisfied): ‘On a scale of 1 to 7 where 1 = ‘Completely Dissatisfied’ and 7 = ‘Completely Satisfied’, please tell me the number which you feel best describes how dissatisfied or satisfied you are with the following aspects of your current situation: your household income’. Full-time teachers and similar professionals only.

### Proportion with low job satisfaction

*Source: UKHLS.* Proportion of respondents who selected 1 (Completely dissatisfied), 2 (Mostly dissatisfied) or 3 (Somewhat dissatisfied): ‘On a scale of 1 to 7 where 1 = ‘Completely Dissatisfied’ and 7 = ‘Completely Satisfied’, how dissatisfied or satisfied are you with your present job overall?’

### **Proportion with low life satisfaction**

*Source: UKHLS.* Proportion of respondents who selected 1 (Completely dissatisfied), 2 (Mostly dissatisfied) or 3 (Somewhat dissatisfied): ‘On a scale of 1 to 7 where 1 = ‘Completely Dissatisfied’ and 7 = ‘Completely Satisfied’, please tell me the number which you feel best describes how dissatisfied or satisfied you are with the following aspects of your current situation: your life overall’.

### **Proportion working part-time**

*Source: LFS.* Proportion of respondents: ‘In your main job were you working full time or part time?’

### **Demand for part-time work**

*Source: LFS.* The measure is derived from a combination of responses and routed questions - see LFS user guide for details. Proportion of respondents: ‘Would you rather work shorter hours than in your present job, even if meant less pay?’ Full-time teachers and similar professionals only.

## **8 References**

Hainmueller, J. (2012). ‘Entropy balancing for causal effects: A multivariate reweighting method to produce balanced samples in observational studies’. *Political Analysis*, **20**, 25-46 [online]. DOI 10.2139/ssrn.1904869.

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The Mere, Upton Park, Slough, Berks SL1 2DQ  
T: +44 (0)1753 574123 • F: +44 (0)1753 691632 • [enquiries@nfer.ac.uk](mailto:enquiries@nfer.ac.uk)

[www.nfer.ac.uk](http://www.nfer.ac.uk)

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