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Technical appendix

Methodology appendix - Teacher Labour Market in England: Annual Report 2022

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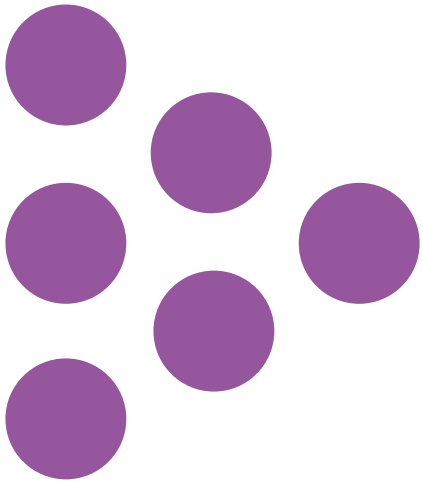

Methodology Appendix – Teacher Labour Market in England: Annual Report 2022

Jack Worth and Henry Faulkner-Ellis

Published in March 2022

By the National Foundation for Educational Research,

The Mere, Upton Park, Slough, Berkshire SL1 2DQ

www.nfer.ac.uk

ISBN: 978-1-912596-57-7

How to cite this publication:
Worth, J. and Faulkner-Ellis, H. (2022). *Methodology appendix - Teacher Labour Market in England: Annual Report 2022*. Slough: NFER.

Contents

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 Annual Population Survey (APS) – that we use to measure teachers' (and similar professionals') well-being, pay and working conditions.
- Section 3 describes the methodology for the senior leader survey and presents information about its representativeness.
- Section 4 explains our methodology for identifying teachers in the household survey datasets.
- Section 5 explains our methodology for identifying groups of similar professionals, by matching their characteristics to the samples of teachers.
- Section 6 explains some details of the analysis we undertake on teacher well-being and working conditions and shows the underlying sample sizes.
- Section 7 describes the different measures we use to describe teachers' (and similar professionals') well-being and working conditions.

2 Data Sources

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

- Initial Teacher Training: Trainee Number Census. Available: https://www.gov.uk/government/collections/statistics-teacher-training
- School Workforce in England. Available: https://www.gov.uk/government/collections/statistics-school-workforce
- LFS / APS. Available from UK Data Service. More information: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/methodologies/labourforcesurveyuserguidance
- NFER senior leader survey on teacher recruitment and retention Oct-Dec 2021. See section 3.

3 NFER senior leader survey – Oct-Dec 2021

NFER conducted a national survey of senior leaders in primary and secondary state schools in England in autumn term 2021 The findings from the survey aims to gain an understanding of teacher recruitment and retention, with a particular focus on how the experience of recruiting and retaining teachers has been affected by the Covid-19 pandemic. The survey themes include:

- the extent of teacher shortages as reported by schools
- how satisfied schools were with the quality of applicants and appointees
- strategies to mitigate the impact of unfilled vacancies on pupils and other teachers
- barriers that teacher shortages have imposed upon the school meeting any achievements
- contextual challenges schools face in terms of recruitment and retention
- the impact that Covid-19 has had on teacher recruitment, retention and deployment.

We received responses from 531 senior leaders in primary schools and 307 senior leaders in secondary schools. The responses were drawn from different categories of school, but the proportions of each school characteristic did not identically match the population. Notable differences between the characteristics of the response sample and the population of all schools, were mostly in school type.

We weighted the survey responses to be representative of the population of state schools in England, according to factors that may be associated with a school's general context and specifically its teacher recruitment and retention situation. We weighted the responses by:

- school type
- quintile of proportion of pupils eligible for free school meals any time in the previous six years
- achieving excellence area category – a local-area measure of educational attainment and capacity to improve (see here for more details)
- whether the school reported at least one open vacancy or temporarily-filled post in the 2020 School Workforce Census
- Ofsted rating
- Category of geographical area (London/ large urban/ medium-sized urban/ small non-coastal, small coastal) (see here for more details)

The weighting was performed using entropy balancing (Hainmueller, 2012). The representativeness of the primary and secondary samples – both before and after weighting – are shown, respectively, in Tables 1 and 2.

Table 1 Representativeness of primary senior leader sample

School characteristic		Population	Sample		
		%	N	Unweighted %	Weighted %
School type	LA Maintained	62	408	77	62
	Single-academy trust	35	103	19	35
	Multi-academy trust	3	20	4	3
Quintile of pupil FSM	Lowest 20%	19	103	19	19
	Middle-lowest 20%	19	130	24	19
	Middle 20%	19	108	20	19
	Middle-highest 20%	19	89	17	19
	Highest 20%	19	100	19	19
	Missing FSM data	4	1	0	4
Achieving Excellence Area Category	Category 1	14	80	15	14
	Category 2	15	83	16	15
	Category 3	17	91	17	17
	Category 4	20	106	20	20
	Category 5	17	96	18	17
	Category 6	17	75	14	17
School had a vacancy or temporarily-filled post	No	92	475	89	92
	Yes	7	35	7	7
	Missing data	2	21	4	2
Ofsted rating	Outstanding	16	90	17	16
	Good	70	384	72	70
	Requires improvement/ inadequate	11	53	10	11
	Missing/ not inspected	3	4	1	3
Type of geographical area	London	11	50	9	11
	Large cities	30	180	34	30
	Medium-sized cities	27	143	27	27
	Small, non-coastal	19	94	18	19
	Small, coastal	13	64	13	13
Total N = 531					

Note: percentages may not sum to 100% due to rounding.

Table 2 Representativeness of secondary senior leader sample

School characteristic		Population	Sample		
		%	N	Unweighted %	Weighted %
School type	LA Maintained	20	82	27	21
	Single-academy trust	58	149	49	58
	Multi-academy trust	21	76	25	21
Quintile of pupil FSM	Lowest 20%	19	78	25	19
	Middle-lowest 20%	19	58	19	19
	Middle 20%	18	53	17	18
	Middle-highest 20%	19	63	21	19
	Highest 20%	18	45	15	18
	Missing FSM data	7	10	3	7
Achieving Excellence Area Category	Category 1	17	45	15	17
	Category 2	14	58	19	14
	Category 3	17	57	19	17
	Category 4	19	50	16	19
	Category 5	17	55	18	17
	Category 6	16	42	14	16
School had a vacancy or temporarily-filled post	No	73	222	72	73
	Yes	24	77	25	24
	Missing data	3	8	3	3
Ofsted rating	Outstanding	19	61	20	19
	Good	53	181	59	53
	Requires improvement/ inadequate	20	55	18	20
	Missing/ not inspected	8	10	3	8
Type of geographical area	London	15	35	11	15
	Large cities	32	93	30	32
	Medium-sized cities	26	91	30	26
	Small, non-coastal	16	48	16	16
	Small, coastal	12	40	13	12
Total N = 307					

Note: percentages may not sum to 100% due to rounding.

4 Defining teachers in household survey datasets

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

- Industry (Standard industrial classification) = 'Primary education' or 'General secondary education'
- Occupation (Standard Occupational Classifications) = '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'.

5 Methodology for identifying similar professionals

The aim of our analysis of teachers' well-being and working conditions is three-fold. We seek to measure how:

1. teachers' well-being and working conditions have changed over time
2. teachers' well-being and working conditions compare to those in other professions
3. the difference in well-being and 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 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.

We re-weight the 'other professionals' group to improve comparability in the underlying personal characteristics between the teacher and other professional groups. This ensures 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, using a similar methodology with different sub-groups of teachers. 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 professional sub-groups all have slightly different analysis weights to ensure the group as a whole has similar characteristics to that which it is matching.

6 Analysis and sample sizes

6.1 LFS/ APS 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 also define a set of sub-divided time periods for analysis of how well-being and working hours has evolved during the Covid-19 pandemic in 2020 and 2021. We divided the period from September 1st 2020 to 1st November 2021 into five periods:

- 1st September 2020 – 20th March 2020: the period before the UK Covid-19 lockdown began and schools closed to all but keyworker and vulnerable children shortly after
- 21st March 2020 – 31st July 2020: the UK lockdown in which most teachers worked from home, as schools were closed to all but keyworker and vulnerable children, with partial re-opening for some year groups, while many children continued to learn from home, supported remotely by their teachers
- 1st September 2020 – 31st December 2020: schools fully re-opened to all pupils.
- 1st January 2021 – 7th March 2021: teachers worked from home, as schools were closed to all but keyworker and vulnerable children.
- 8th March – 31st July 2021: schools fully re-opened to all pupils.

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 in the LFS/ APS analysis are shown in Table 3. 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). The sample sizes of both teachers and other professionals have generally been falling slightly over time, which is due to

falling response rates to the LFS across the whole population (see the Office for National Statistics methodology report for more details).

In the main report we present the averages from a straightforward analysis of the measures split by the different time periods. We conducted further analysis to test whether the patterns in the data remained after controlling separately for seasonality (e.g. changes in well-being through different times in the year, which happen every year and were not specific to 2020). We also test for mode effects, since the LFS data collection methodology changed from a mixture of face-to-face and telephone to full telephone surveying as a result of the pandemic. We used regression analysis to include the controls and conduct the tests. The patterns from the regression outputs were very similar to the raw averages, so for simplicity of reporting we present the simple averages.

Table 3 Sample sizes for LFS/ APS analysis

Year	Sample size of teachers	Sample size of similar professionals
2010/11	4,092	20,358
2011/12	4,153	23,479
2012/13	3,917	23,270
2013/14	4,068	24,633
2014/15	3,847	23,320
2015/16	3,720	22,587
2016/17	3,409	22,705
2017/18	3,368	22,897
2018/19	3,150	22,488
2019/20	3,049	21,567
2020/21	2,954	25,567
2019/20 Covid-19 analysis		
1st Sep 2019 – 20th Mar 2020	1,715	12,402
21st Mar 2020 – 31st Jul 2020	1,021	7,090
1st Sep 2020 – 31st Dec 2020	914	6,581
1st Jan 2021 – 7th Mar 2021	626	5,283
8th Mar 2021 – 31st Jul 2021	1,136	10,822

Source: Labour Force Survey / Annual Population Survey.

7 Teacher well-being and working conditions measures

Anxiety

Source: APS. Average (mean) response to 'Overall, how anxious did you feel yesterday?' on a scale of 0 "not at all" to 10 "completely".

Life satisfaction

Source: APS. Average (mean) response to 'Overall, how satisfied are you with your life nowadays?' on a scale of 0 "not at all" to 10 "completely".

Happiness

Source: APS. Average (mean) response to 'Overall, how satisfied are you with your life nowadays?' on a scale of 0 "not at all" to 10 "completely".

Feeling that the things you do in your life are worthwhile

Source: APS. Average (mean) response to 'Overall, to what extent do you feel the things you do in your life are worthwhile?' on a scale of 0 "not at all" to 10 "completely".

Full-time working hours in the reference week

Source: LFS. Average (mean) response to 'Thinking now about the seven days ending Sunday the [last week], how many hours did you actually work in your (main) job/business – please exclude meal breaks?' Only includes respondents who reported being scheduled to work on every day from Monday-Friday in the reference week and did not have any days off in the reference week due to being sick/injured.

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.

Median full-time annual gross salary (real terms)

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 2021 prices using the quarterly consumer prices index. 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.

NFER
National Foundation for Educational Research

Evidence for excellence in education

Public

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

www.nfer.ac.uk

NFER ref. NTLM

ISBN. 978-1-912596-57-7