A geography of employment and earnings: Autumn 2021

Updated experimental statistics classifying local variations in graduate opportunities

Contents

Summary

1. In June 2021, the Office for Students (OfS) presented a method for grouping areas based on measures of local graduate opportunity. This report uses the same method with updated data. The method could help contextualise graduate outcomes by capturing some of the labour market differences experienced by graduates living in different parts of the UK. We demonstrate it with two different measures:

    a. **Above-threshold earnings or further study** using updated Longitudinal Education Outcomes (LEO) data. Areas are classified using the proportion of graduates earning over a threshold or studying in higher education three years after graduation.

    b. **Highly skilled employment or further study** using Graduate Outcomes (GO) survey data for the first time. Areas are classified based on the proportion of graduates who are in professional or managerial jobs 15 months after graduation.

2. We developed this method using travel to work areas (TTWAs), which are defined using commuting patterns. Using this definition, most people work in the same TTWA as their home. There are 228 TTWAs in the UK, mostly centred around towns and cities.

3. For each measure we divided the TTWAs into five groups, or 'quintiles'. Figure 1 shows the two groupings. The map on the left shows areas grouped by the proportion of graduates in well-paid work or further study, and the map on the right shows areas grouped by rates of highly skilled employment. Dark blue areas have the highest rates (quintile 5), and dark red areas have the lowest (quintile 1).

Figure 1: Groupings using earnings data (left) and highly skilled employment (right)
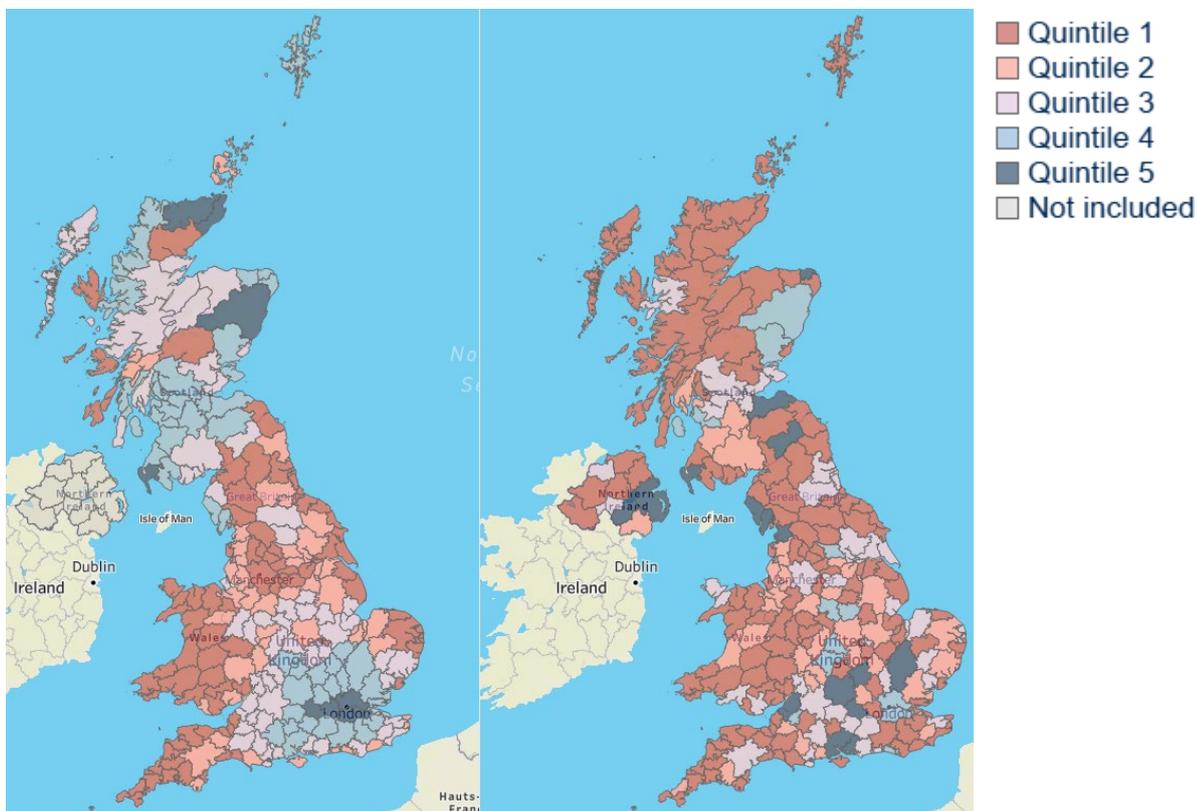
Source: OfS analysis of LEO data (left) and Graduate Outcomes survey data (right). Quintile 5 areas have the highest rates.

4. While areas in the top quintiles for well-paid work were mostly centred around London or in Scotland, areas in the top quintiles for highly skilled employment were spread more evenly. However, for both sets of quintiles a higher proportion of graduates in the southern regions of England were in top quintile areas than in the northern regions.

5. The rates of highly skilled employment varied less between areas than the rates of above-threshold earnings. This suggests that opportunities for highly skilled work are distributed more evenly across the country. In the lowest quintile areas 67 per cent of graduates were in highly skilled jobs, compared to 77 per cent in the highest quintile areas.

6. For the first time we are releasing data on the proportion of graduates from each English university or college who fall into each quintile. This will show whether graduates from each university and college tend to go to areas with lower or higher proportions of good job opportunities.

7. We also present new data showing the quintiles for smaller areas within each TTWA, for context and to invite comment on how homogenous each area is.

This publication is an experimental official statistic and we are actively seeking feedback on the methods and any improvements that could be made to these or to the presentation of the groupings.

We are also keen to understand how you might use these classifications. Please get in touch with us at official.statistics@officeforstudents.org.uk to let us know your thoughts and feedback.

Introduction

Rationale

8. As the Office for Students, we want to ensure that students leave their courses with the knowledge, qualifications, skills and attributes that are required by employers, both now and into the future, or which support the setting up of their own businesses. We want to see educated graduates, from all forms of higher education, who can flourish in the world as it is today and might be tomorrow.[1]

9. In this report we update our previous publication[2] which showed one way of adding a geographical context when considering graduate outcomes. Although individual students will define their success beyond graduation in relation to their own goals and motivations, for illustrative purposes this report continues to focus on earnings and highly skilled employment. The method we use in this publication could potentially use other graduate outcome measures, draw from other data sources, or be applied to different geographies.

10. While this report highlights the differences between areas and provides a way to account for them, we also show that there are good opportunities for graduates available everywhere in the country. We are not presenting certain areas as better alternative destinations for graduates but giving geographical context for wherever they chose to live.

11. We are publishing this research report because we consider that there is a strong public interest in publishing information about student outcomes from higher education. Understanding the geographical context for different groups of graduates may be particularly important in gaining a better understanding of employment outcomes and how they are linked to the area where the graduates are living. For instance, information that allows us to articulate the ways in which graduates living in the South West looking for employment face a different situation to those entering the labour market in London. We judge that publishing new, innovative classifications, which are intended over the longer term to improve the information available about student outcomes, is consistent with our general duties in section 2 of the Higher Education and Research Act 2017.

12. We are developing and publishing this quintile-based approach in anticipation that it could potentially provide a useful mechanism for the contextualisation of data about graduate employment outcomes. We expect that methods for understanding the geographical context of graduate employment outcomes will be of interest and value to a range of stakeholders. By introducing a new classification of local variations in graduate opportunities, through this publication of experimental statistics,[3] we are involving potential users at an early stage in assessments of their suitability.

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[1] For more on the OfS strategy, see www.officeforstudents.org.uk/about/our-strategy/.

[2] See www.officeforstudents.org.uk/publications/a-geography-of-employment-and-earnings/.

[3] Experimental statistics: A subset of newly developed or innovative official statistics undergoing evaluation. Experimental statistics are published to involve users and stakeholders in the assessment of their suitability and quality at an early stage.

Above-threshold earnings and highly skilled employment

13. In this analysis we have developed two separate and complementary groupings, referred to as 'Local graduate opportunity groupings'.

14. The first grouping relies on an earnings-based measure using LEO data. It classifies areas across the UK based on the proportion of employed graduates in each area earning above a threshold or in further study (at any level).[4]

15. The second grouping relies on job type classification using Graduate Outcomes (GO) survey data. This classifies areas based on the proportion of employed graduates who are in professional or managerial jobs, further study or have other positive outcomes 15 months after graduation.[5]

16. While the LEO data source pre-dates the COVID-19 pandemic, the GO survey was carried out between 1 December 2018 and 30 November 2020, which means the pandemic may have had some effect on jobs taken and where graduates were working.

17. The OfS will consult shortly on the construction of measures of student outcomes we intend to use in our regulation of providers, which includes the measures used in this report. This consultation is linked to upcoming consultations on our approach to regulating quality and standards in respect of student outcomes (including through the TEF scheme).

Travel to work areas

18. We have used travel to work areas (TTWAs) in this analysis. While the method would work for other geographies, TTWAs seem a natural fit. They are defined using commuting patterns to determine areas where most people live and work in the same area. Thus, relatively few people in each TTWA cross over to a different TTWA to go to work. Each one tends to consist of a major town or city and the area around it. There are 228 of these areas in the UK.[6]

19. Because these areas are developed statistically, they differ greatly in size. More than 50 TTWAs have fewer than 60,000 people living in them whereas the largest TTWA, relating to London and some surrounding areas, has 8.4 million people.[7]

20. Within some TTWAs, particularly those containing large cities, there will be sub-areas where the employment patterns are very different to the rest of the TTWA. The groupings are designed to broadly indicate the job opportunity profile for people living in each area rather than

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[4] The threshold for each year is defined as the national median earnings for graduates and non-graduates aged 25-29 years, which in 2018-19 was £24,000. See paragraph 24 for more information.

[5] For the purposes of this analysis, professional or managerial jobs are defined as Standard Occupational Classification (SOC2020) groups 1-3. See paragraph 51 for more information. The other positive outcomes consist of travelling, caring and being retired.

[6] See the Office for National Statistics website for more information on travel to work areas: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/traveltoworkareaanalysisingreatbritain/2016.

[7] See https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/traveltoworkareaanalysisingreatbritain/2016#population.

capturing everything which is distinctive about the area. In this report we have carried out further analysis on variations within individual TTWAs.

21. We had previously intended to use an alternative set of TTWAs[8] based solely on people with a higher education qualification, which are larger to reflect the greater distances typically travelled to work. However, on further investigation, we consider the downsides of using these areas to outweigh the benefits. The alternative TTWAs have been developed to give interesting additional information about travel patterns but are much less commonly used and have not had the full cleaning process applied to the standard TTWAs. This means the areas are not always self-contained, are somewhat fragmented, and there are few other sources of data available using this geography.

Changes in this report

22. We have made a number of changes in this update.

    a. As planned, we have replaced the previous highly skilled grouping with a grouping based on Graduate Outcomes survey data.

    b. We have used updated LEO data, relating to financial years 2016-17 to 2018-19, and tweaked the population.[9]

    c. The above-threshold earnings measure now counts any further study as a successful outcome rather than higher-level study only.

Feedback

This report is an experimental official statistic which falls under the official statistics' Code of Practice. We are actively seeking feedback for this analysis. Please email comments to Adam Finlayson at official.statistics@officeforstudents.org.uk.

In particular, we welcome feedback on the following aspects:

- Whether the TTWAs are suitable for this purpose

- Whether there are groups of students or types of provision which could be misunderstood using these quintiles

- Whether there may be unintended consequences from using these quintiles in combination with other student characteristics

- Whether students could benefit through us publishing further data.

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[8] See https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/traveltoworkareaanalysisingreatbritain/2016#alternative-travel-to-work-areas.

[9] See Annex A for more information.

Grouping 1: Graduates with above-threshold earnings or in further study (LEO data)

Data and definitions

23. This grouping uses LEO earnings and study for UK undergraduate qualifiers three years after they completed their course, combining data from financial years 2016-17, 2017-18 and 2018-19.[10] LEO data is available for all UK graduates who were paying tax in the UK, and there are 1,160,490 used in our data.

24. We group areas based on the proportion of graduates living there who were:

    a. **Earning over a threshold**. The threshold for each year is defined as the national median earnings for graduates and non-graduates aged 25 to 29 years[11], which in 2018-19 was £24,000. All graduates earning over this threshold will count positively towards the metric, whether they earned £25,000 or £100,000.

       or

    b. **In further study**. Any graduates studying on a course leading to a higher education qualification will count positively. Note that this is a change from the previous publication which only counted study as a positive outcome if it was at a higher level.

25. We have assigned each travel to work area a quintile based on the proportion of graduates living in that area who earned over the threshold or were in higher-level study. For instance, in London a high proportion of graduates earned over the threshold or were in further study, so London is assigned the top quintile, five. We have constructed the quintiles such that the number of graduates in paid employment or study in each quintile is as close to one-fifth as possible. This means that there may be different numbers of travel to work areas in each quintile.[12]

26. It is important to bear in mind that there may be multiple reasons why areas are in higher or lower quintiles. As well as differences in the local labour market and availability of study opportunities in different areas of the country, there are also differences in the personal characteristics, pre-higher education qualifications and subject studied for graduates in each area. This means the differences between areas should not be considered causal. In other words, it is not always the case that if a graduate moved to an area in a higher quintile their chance of earning above the threshold would increase.

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[10] For more information on the data and definitions, see Annex A.

[11] The median for national earnings is based on all 25 to 29-year-olds, including both graduates and non-graduates. The median for each financial year is drawn from the annual ONS/HMRC publication, Personal Income Statistics, and rounded to the nearest £500. The medians used in the other years were £22,000 in 2016-17 and £23,000 in 2017-18.

[12] We exclude graduates living in Northern Ireland from the main calculations, because the lack of LEO data for Northern Irish providers means that estimates may be unreliable. Proxy quintiles are included in the supplementary data tables but should be used with caution. Graduates who were abroad or had an unknown area are also excluded.

Results

27. Table 1 shows the number of travel to work areas (TTWAs) in each quintile. It shows that the average proportion of graduates in each quintile earning above the threshold or in higher-level study ranges from 50.6 per cent in quintile 1 to 71.4 per cent in quintile 5.

Table 1: Summary table of LEO local graduate opportunity groups

| Quintile | Number of TTWAs | Number of graduates | Percentage earning above threshold or in higher study | | | Range of values in quintile min - max (ppts) |
			Minimum (%)	Average (%)	Maximum (%)	
1 (lowest)	73	255,175	40.1	50.6	53.9	13.8
2	40	214,475	54.0	55.4	56.5	2.5
3	54	222,180	56.6	58.6	61.4	4.8
4	44	216,435	61.6	64.8	69.7	8.1
5 (highest)	7	252,230	70.0	71.4	73.4	3.4
Total	**218**	**1,160,490**		**60.2**		

Note: The Average column shows the average of the graduates in each quintile, rather than the average of the areas making up each quintile. In all figures and tables in this analysis, numbers are rounded to the nearest five and percentages are rounded to the nearest 0.1 per cent. Proportions and totals are calculated using unrounded numbers.

28. Table 1 shows that quintiles 2 and 5 are narrower than the others, both three percentage points wide. This does not mean the quintiles are unstable because the areas in these quintiles are reasonably sized (all have at least 130 graduates and 90 per cent have at least 350). However, when using these quintiles care should be taken not to assume that areas in quintile 2 are very different from those in quintiles 1 or 3, and similarly that areas in quintile 5 are very different from those in quintile 4.

29. There are fewer TTWAs in quintile 5. This is because the quintiles are defined to have an equal number of graduates rather than an equal number of areas, and the large number of graduates in the London TTWA make up most of quintile 5.

30. Figure 2 shows which area has been assigned to which quintile.

Figure 2: Map of LEO local graduate opportunity grouping
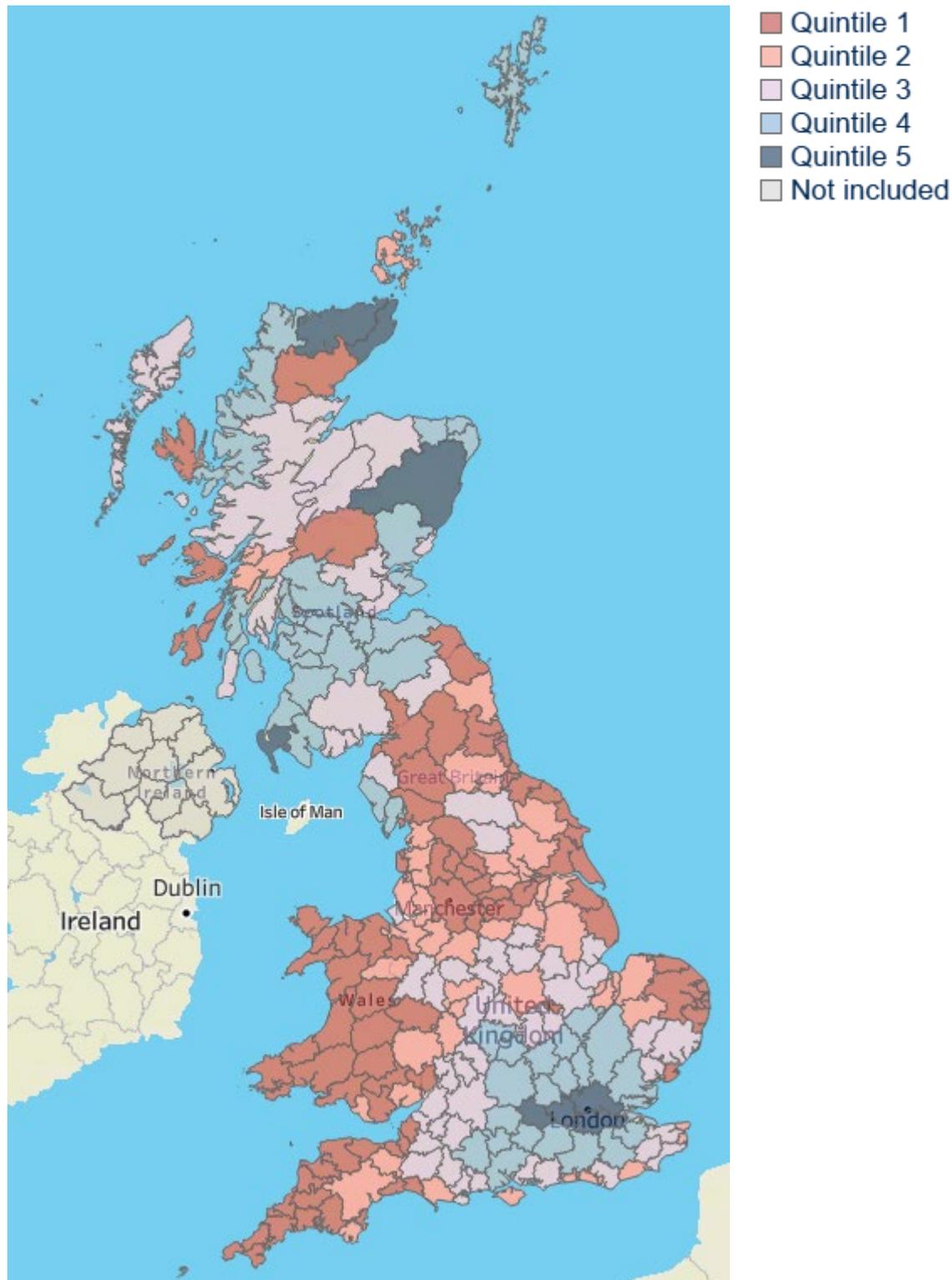
Source: OfS analysis of LEO data. Note that Northern Ireland is not included because graduates from Northern Irish providers are not in the LEO data.

31. Figure 2 shows that most of the areas with the highest proportion of graduates earning over the threshold were centred around London or in Scotland. Most areas with the lowest proportion of graduates earning over the threshold were in Wales, coastal areas or the North of England.

32. To help quantify these patterns, Figure 3 shows the proportion of graduates in each region falling into each quintile. For instance, most graduates in Scotland lived in areas which were in the highest quintiles (4 or 5), and only a small proportion were in quintile 1 or 2 areas.

Figure 3: Summary of LEO quintiles by region
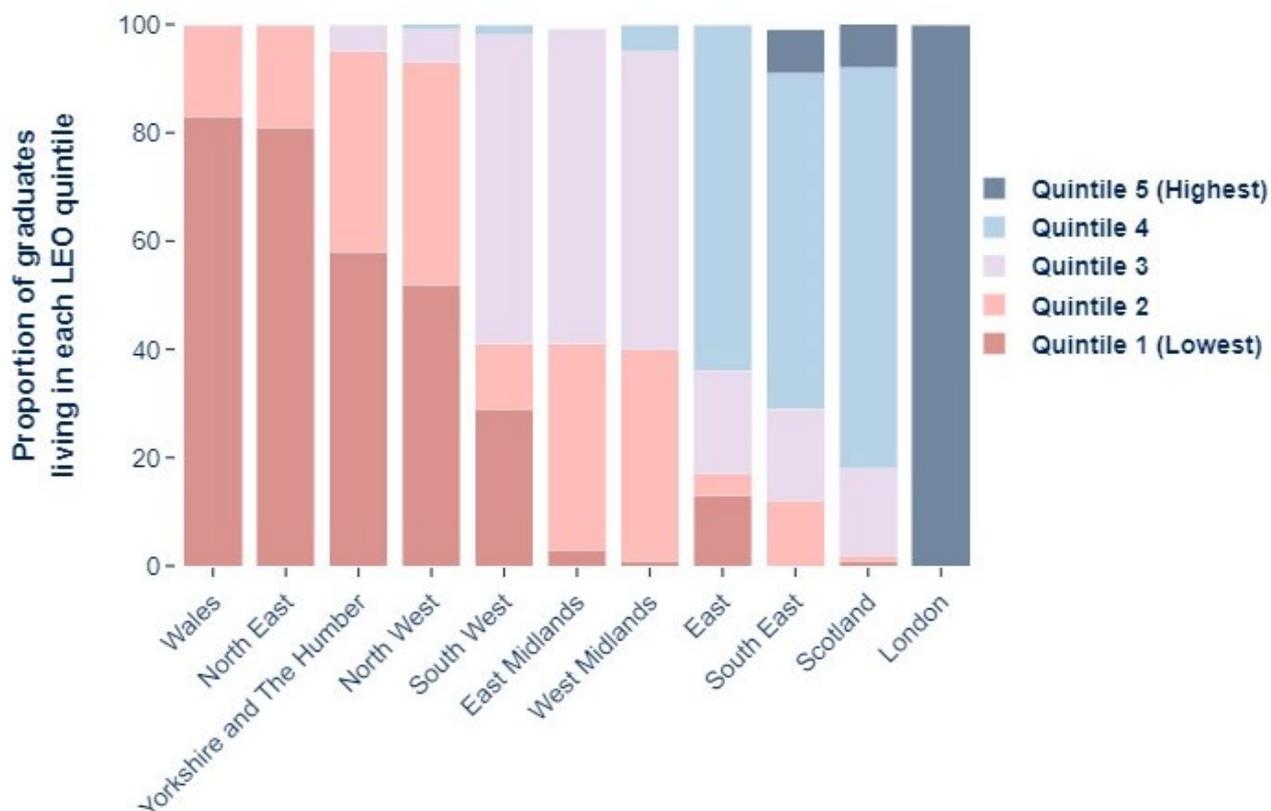
33. Figure 3 shows that most graduates in the North or in Wales lived in quintile 1 areas – the areas with the lowest proportion of graduates earning over the threshold or studying. Most graduates in the Midlands or the South West were in quintile 3, most of those in the East, South East or Scotland were in quintile 4, and all those in the London region (made up of just two TTWAs) were quintile 5 areas.

34. We have published interactive maps and data tables alongside this report to enable further exploration.[13]

Analysis of smaller sub-areas

35. The rationale for using TTWAs is that it approximates the search space for available jobs within a distance typically commuted by others living nearby. In this way we can account for the jobs available to graduates within each TTWA, rather than controlling for exact neighbourhood they are in, as this may be influenced by many other factors.

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[13] To explore our interactive maps, see www.officeforstudents.org.uk/data-and-analysis/a-geography-of-employment-and-earnings/.

36. In this section we use new LEO data at a more detailed geography to present more detail on where each graduate is living, to add context and invite comment on how valid it is to treat TTWAs as homogenous areas.

37. The small areas we are using for this analysis are called 'middle-level super output areas' (MSOAs).[14] There are 8,480 MSOAs in Great Britain, all with at least one graduate in the LEO population, and on average each had 125 LEO graduates over the three years included. One in four MSOAs have 90 or fewer graduates across the three years.

38. Figure 4 shows the map of MSOA quintiles with the TTWA boundaries overlaid.

Figure 4: Map of MSOA quintiles and TTWA boundaries
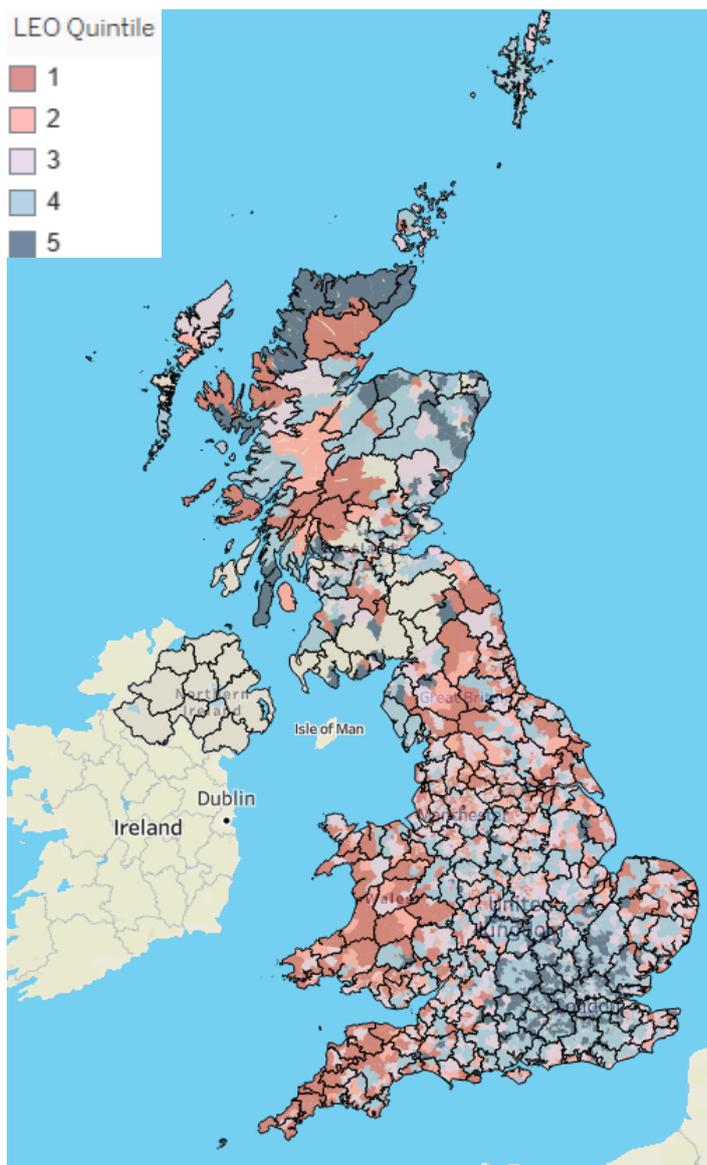
Note: MSOAs in Britain with fewer than 15 graduates are excluded and appear as grey. Northern Ireland is not included because Northern Irish universities are not in the LEO data.

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[14] We use the 2011 version of these areas. In Scotland the areas equivalent to MSOAs are called Intermediate Zones and in Northern Ireland the areas are called Super Output Areas. Travel to work areas are defined using the smaller 'lower level super output areas' (LSOAs) but we use MSOAs so that there are enough graduates in each area for meaningful analysis. This means in some cases an MSOA will be part of two travel to work areas.

39. Figure 4 shows that most TTWAs have a variety of MSOA quintiles. This is not surprising given the small range of each quintile and the smaller size of most MSOAs. It shows that within most TTWAs some neighbourhoods have a different proportion of graduates in well paid jobs. The map shows that these are generally scatted throughout the TTWA rather than being a coherent set of MSOAs which are clearly different.

40. It is useful to consider the London TTWA in more detail. It is by far the largest TTWA, so if there are groups of MSOAs which are clearly separate and qualitatively different it may be beneficial to split London into multiple areas. Figure 5 shows the same as the map above, but zoomed in to the London TTWA.

Figure 5: Map of MSOA quintiles within the London TTWA
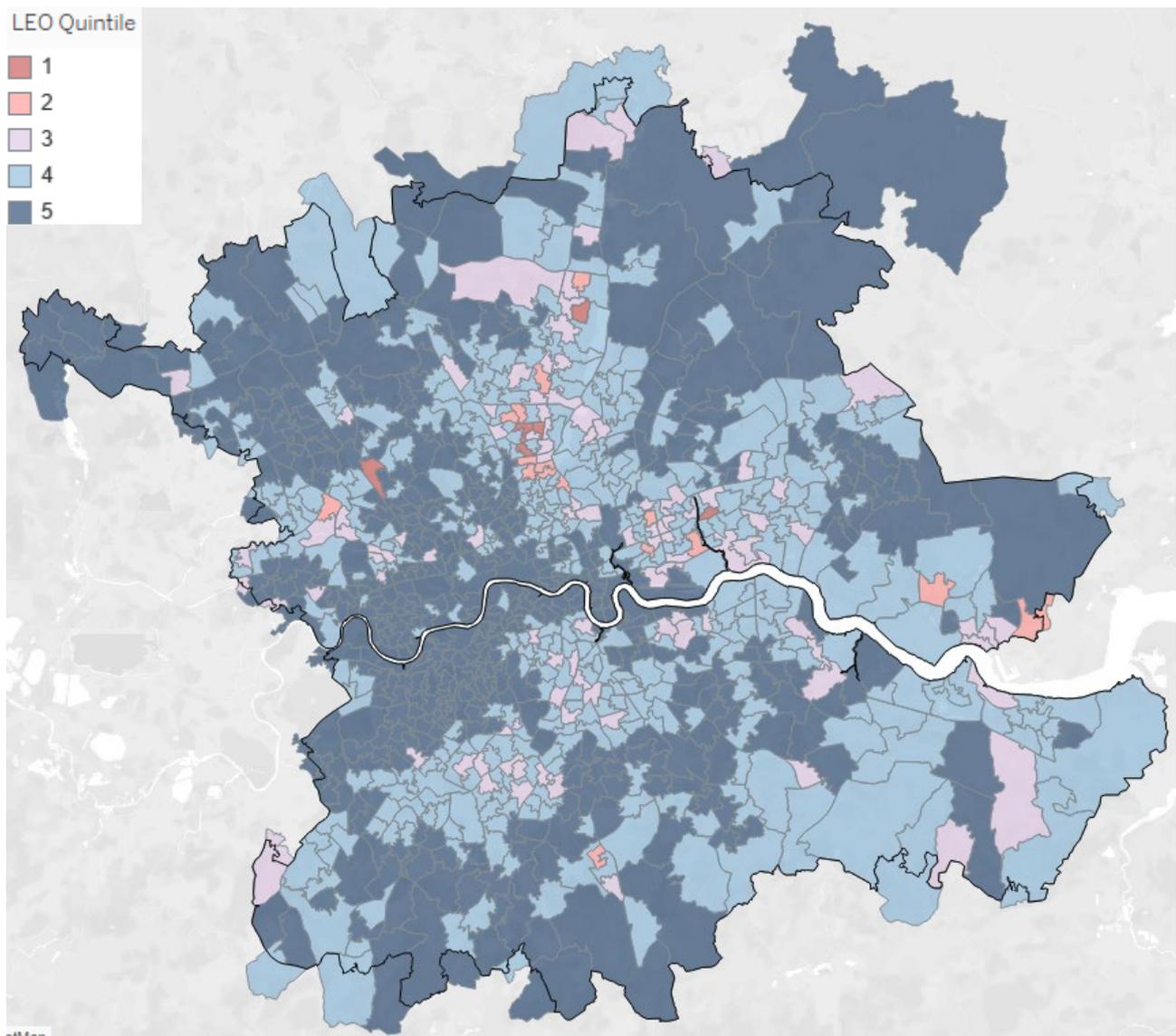
41. Figure 5 shows that while there are many parts of London which are not in quintile 5, there are not any areas without a quintile 5 area nearby. Even the areas with the lowest proportion of graduates in well-paid jobs were close to quintile 5 areas, suggesting that reasons other than geographical distance were behind the difference in rates.

42. Further, while many MSOAs have a different quintile to the TTWA surrounding them, this is largely explained by the relatively small number of graduates in the MSOA. Even if the

underlying rate for the MSOA was the same as the TTWA, it would often move to a different quintile simply due to random variations. See Annex B for more information.

43. An exception is that more quintile 1 MSOAs are in quintile 3 TTWAs than you would expect. Further exploration shows that this is often due to towns or cities in quintile 3 TTWAs with a number of quintile 1 MSOAs in the centre. For instance, Figure 6 below shows the map for the Bristol TTWA, which has a TTWA quintile of 3.

**Figure 6: Map of MSOA quintiles within the Bristol TTWA**
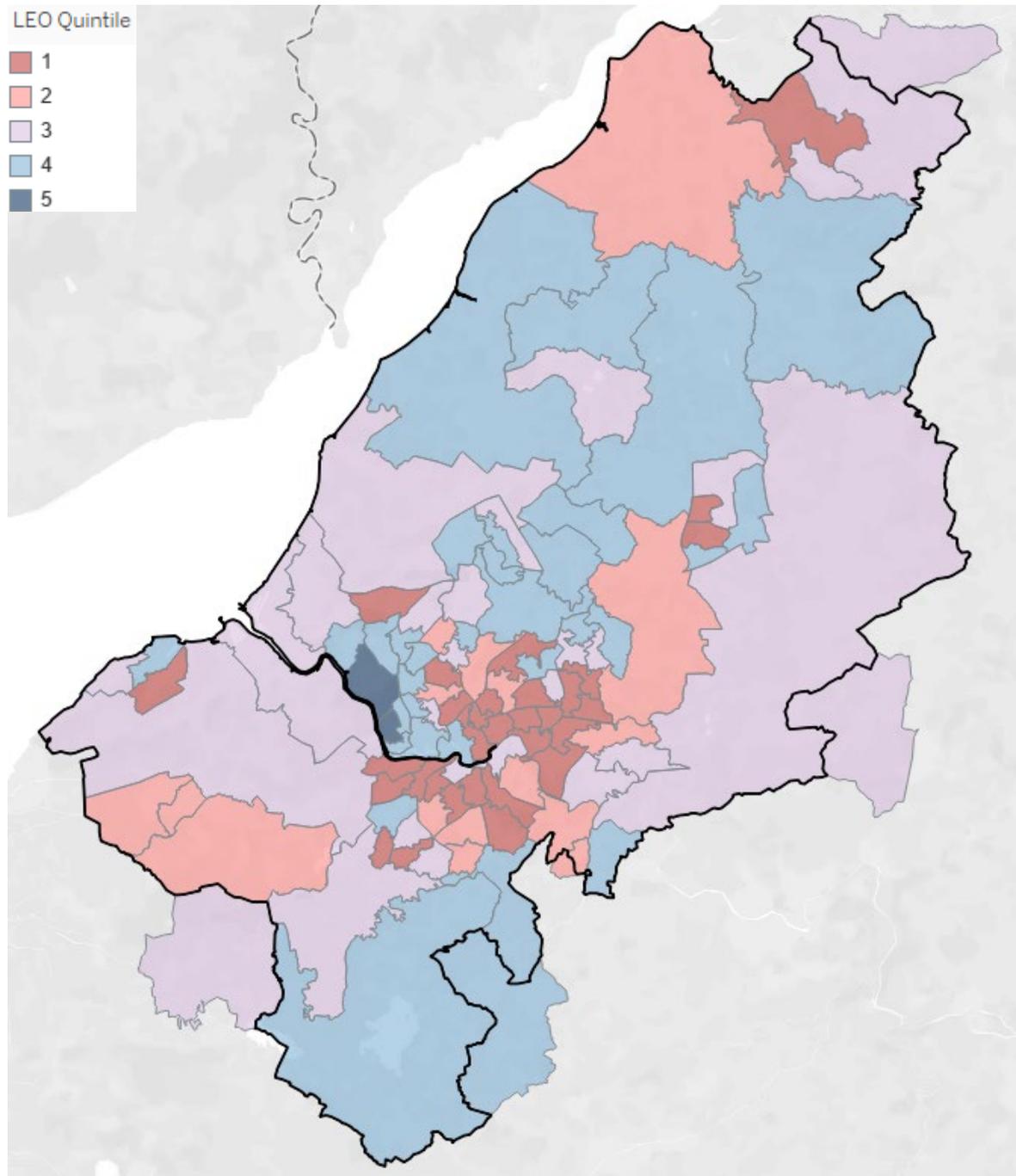
44. Figure 6 shows that there is a cluster of quintile 1 areas in the middle of the city. However, all the quintile 1 MSOAs are close to areas with higher proportions of well-paid jobs and are within a typical commuting distance of much of the rest of the TTWA. This highlights that links

between geography and well-paid jobs go beyond the full range of jobs available within a typical commuting distance.

University and college results

45. This section considers how graduates' LEO quintiles vary depending on which university or college they attended (restricted to providers in England). This is accompanied by the supplementary data tables which give the number of graduates who were living in each TTWA from each university or college and the total proportion in each quintile.

46. Figure 7 shows the proportion of graduates from each university or college living in each quintile three years after graduation.

Figure 7: Proportion of graduates in each LEO quintile from each English university or college
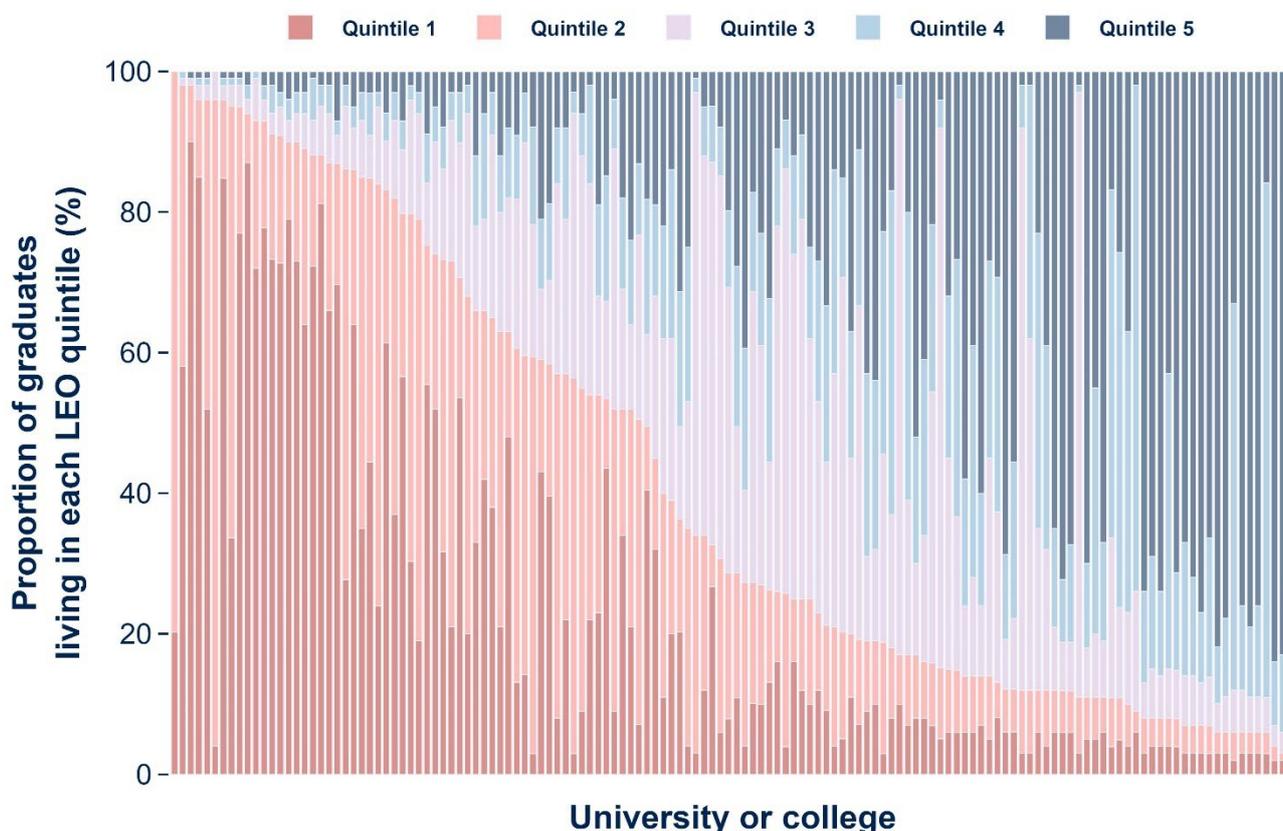
Note: Based on universities and colleges in England registered with the OfS. This figure shows those with at least 1,000 graduates in the LEO population across the three years. The supplementary data tables also include data for smaller universities and colleges.

47. Figure 7 shows that there is a wide variety in the LEO local graduate outcome quintiles across the sector. In some universities and colleges, nearly all their graduates live in quintile 1 or 2 areas, whereas for others a very small proportion live in such areas.

Grouping 2: Graduates with highly skilled jobs (Graduate Outcomes survey data)

Data and definitions

48. The Graduate Outcomes (GO) data is based on a survey of qualifiers from higher education 15 months after they finished their course. It records their current activities, the type of work they are doing, and the location of their employer.

49. The outcome measure we have used in this classification is based on:

- UK undergraduate qualifiers

- both full-time and part-time courses

- universities and colleges in England and universities in the rest of the UK

- graduates who responded to the survey and had a known activity (including unemployed and looking for work) 15 months after graduation.

50. It measures the proportion of these graduates who were:

a. **In highly skilled employment.** Jobs have been categorised using information provided about the job title and typical duties into a Standard Occupation Classification (SOC2020).[15] We use this to identify jobs which can be considered highly skilled. For the purposes of this analysis, 'highly skilled' refers to jobs in the categories relating to professional and managerial roles (SOC major groups 1-3).[16]

   or

b. **In further study.** If a respondent said they were engaged in a course of study, training or research during the week of the survey, this is counted as a positive outcome. This applies whatever type or level of course they were doing.

   or

c. **Travelling, retired or caring for someone.** If respondents were travelling, retired, or caring for someone the week of the survey, this is counted as a positive outcome.

51. We have pooled two years of GO data to increase the sample size and robustness. This analysis covers the surveys carried out between December 2018 and November 2020, which relate to graduates who completed their course between August 2017 and July 2019.

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[15] Originally the 2017 Graduate Outcomes survey data was coded using the SOC2010 classification, but this data has been adapted to match the SOC2020 classification.

[16] If someone cannot be assigned to a SOC group based on the information they provided in the survey, an approximation is used based on the types of job taken by others at the same provider.

52. Table 3 shows the number of graduates from each year who were surveyed, and the proportion who responded to the survey.[17]

Table 3: Number of graduates surveyed and responded

	2017-18	2018-19	Overall
Did not respond	187,285	184,175	**371,465**
Responded	231,700	236,160	**467,860**
Total number eligible to be surveyed	**418,985**	**420,340**	839,325
% responded	55.3%	56.2%	**55.7%**

53. Each graduate was assigned to a travel to work area based on the information they reported in the survey. For most graduates, this was simply the area containing their employer postcode. For those who did not include their employer postcode (or were not employed), we used information on where they were studying. For 24 per cent of respondents there was no way to assign them to an area using the GO data, so we used the permanent home location from their original course as the most likely area where they were living.[18] We refer to the area assigned to each graduate as the area where they were based.

Grouping methodology

54. Each travel to work area is assigned a quintile based on the proportion of graduates based in that area who were in highly skilled employment or further study. For instance, in the Reading travel to work area a high proportion of graduates were in professional or managerial roles, so Reading is assigned the top quintile, quintile 5.

Results

55. Table 4 presents the number of areas and the distribution of highly skilled proportions in each quintile. It shows that the areas in quintile 5 had highly skilled employment rates of 77 per cent, whereas in quintile 1 areas 67 per cent of respondents were in highly skilled employment or further study.

Table 4: Summary table of GO local graduate opportunity groups

Quintile	Number of TTWAs	Total number of respondents	Percentage in highly skilled employment or further study			Difference min to max (ppts)
			Minimum (%)	Average (%)	Maximum (%)	
1 (Lowest)	129	90,325	45.0	67.2	69.9	25.0
2	37	82,080	70.2	71.4	72.5	2.4
3	35	100,180	72.7	73.4	74.5	1.8

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[17] There were fewer than five graduates who responded but whether their outcome was successful or not could not be determined or approximated from the information they provided. These have been excluded.

[18] See Annex C for more information on how areas were defined.

Quintile	Number of TTWAs	Total number of respondents	Percentage in highly skilled employment or further study			Difference min to max (ppts)
			Minimum (%)	Average (%)	Maximum (%)	
4	11	133,710	74.5	75.3	75.5	0.9
5 (Highest)	16	52,170	75.6	77.1	79.9	4.3
Total	228	458,465				

Note: The Average column shows the average for graduates in each quintile, rather than the average of the areas making up each quintile.

56. Table 4 shows that there was little variation between areas in quintiles 2-5: less than 6 percentage points between the average for quintile 2 and the average for quintile 5. This means most areas would change quintile with a change of one percentage point, which suggests the exact quintile an area is in may change year to year.[19]

57. There was more difference between areas within quintile 1, with 25 percentage points difference between the lowest and the highest rates. However, there were few areas with the lowest rates: just seven of the 129 areas had rates below 55 per cent, and they tended to be small.

58. The number of respondents in quintile 4 is much larger than the other quintiles, and the number in quintile 5 is lower. This is because of the size of the London TTWA, which is on the upper boundary of quintile 4. It contains 21 per cent of all respondents so – whether it was in quintile 4 or fell into quintile 5 – the London TTWA would distort the size of those quintiles.

59. Figure 8 shows which area has been assigned to which quintile.

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[19] For more analysis of the stability of the quintile assignment see Annex D, which uses a simulation approach.

**Figure 8: Map of GO survey local graduate opportunity groups**
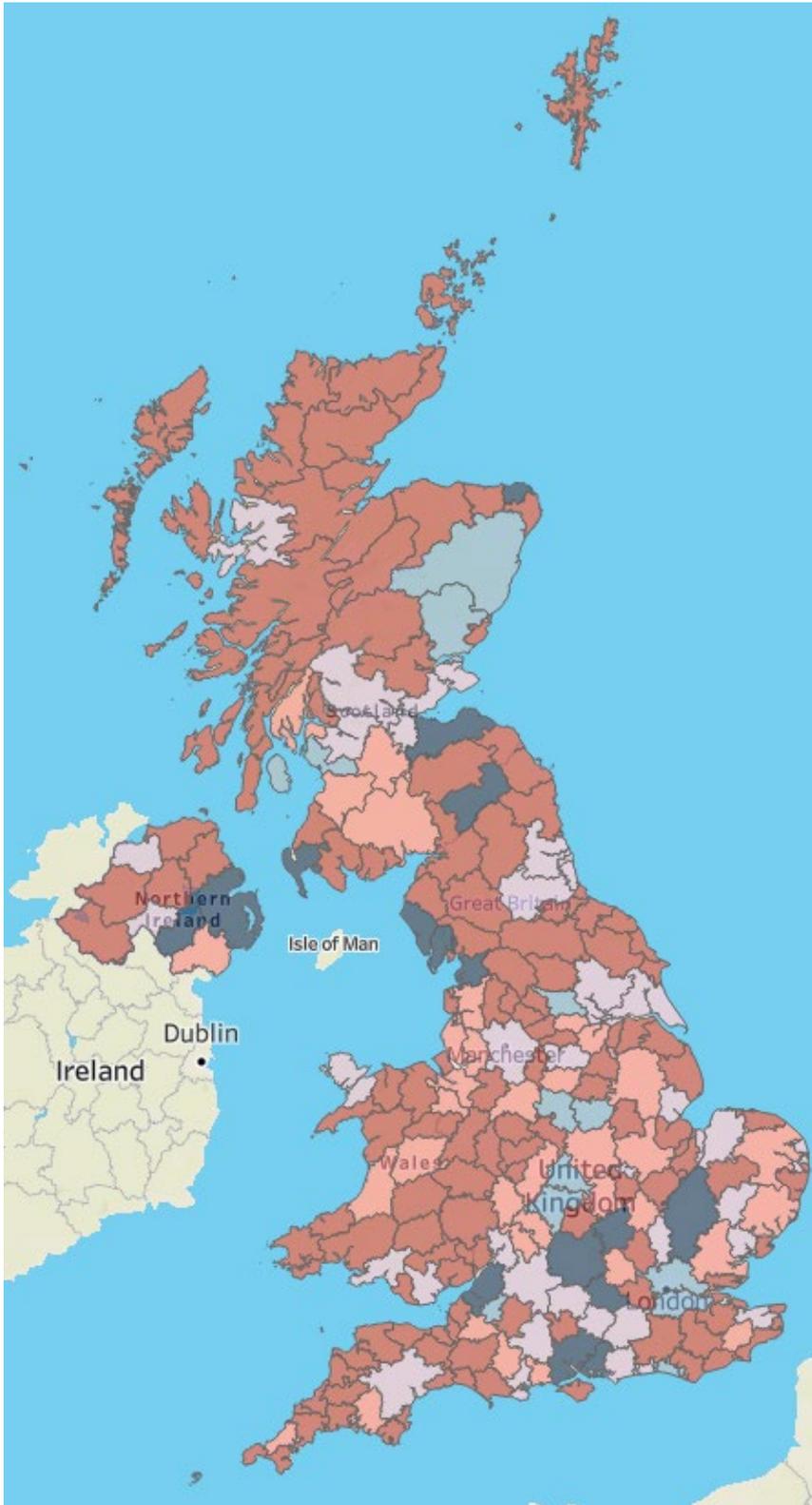
60. Figure 8 shows that the areas with the highest proportion of graduates in highly skilled jobs were mostly in the south of England, but with a number of quintile 4 and 5 areas across the rest of the country.[20]

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[20] See the interactive maps and data tables published alongside this report for more detail.

61. To help quantify these patterns, Figure 9 shows the proportion of graduates in each region falling into each quintile. For instance, most graduates in the West Midlands lived in areas which were in the lowest quintiles (1 or 2), and a small proportion were in quintile 4.

Figure 9: Summary of GO quintiles by region
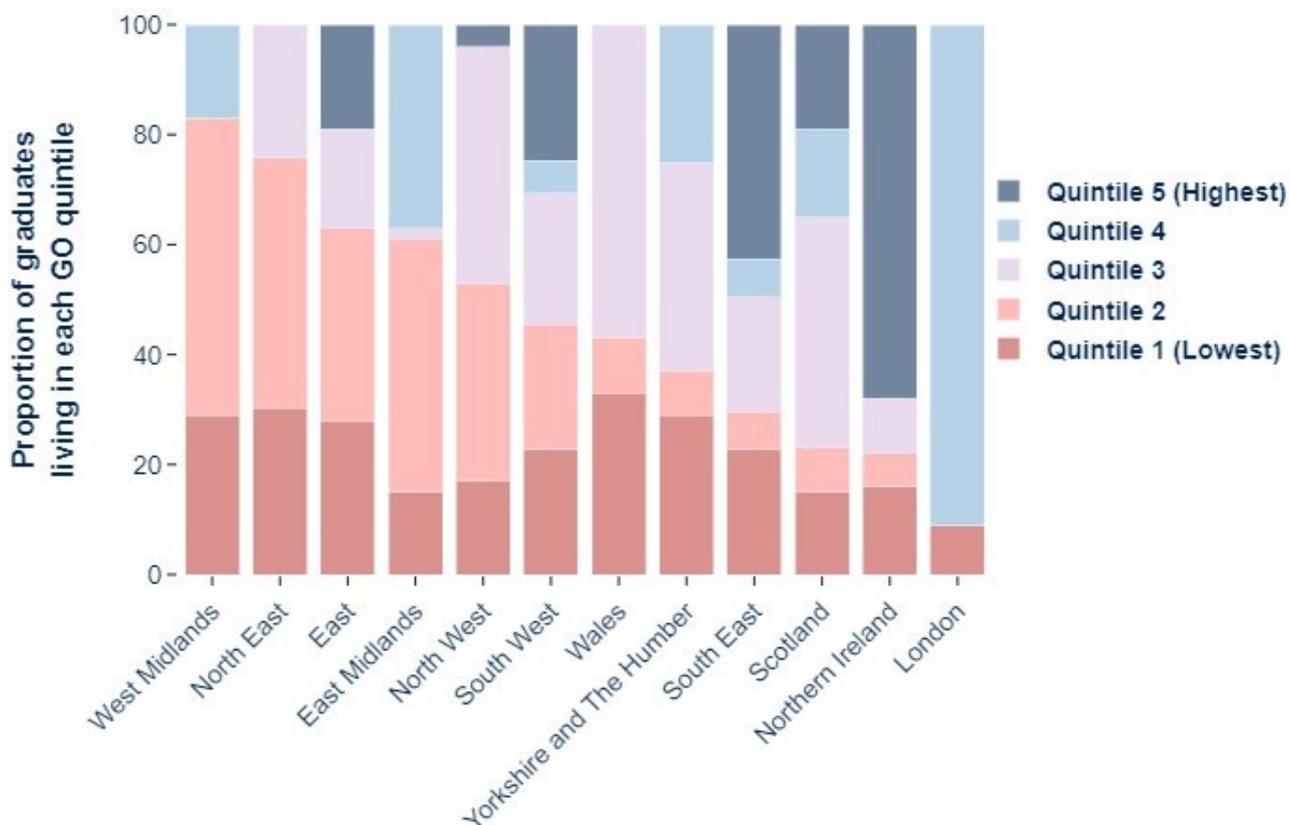
62. Figure 9 shows that every region had some areas with the lowest rates of highly skilled employment. The London region consists of two TTWAs, one of which was in quintile 1.

63. However, the proportion of graduates based in areas with higher proportions of highly skilled work varied from region to region. The northern regions of England had fewer areas in quintiles 4 and 5 than the southern regions. Most graduates based in Northern Ireland were in the Belfast TTWA, which was assigned quintile 5.

University and college results

64. This section considers how graduates' GO quintiles vary depending on which university or college they attended (restricted to providers in England who were registered with the OfS). This is accompanied by the supplementary data tables which give the number of graduates who were living in each TTWA from each university or college and the total proportion in each quintile.

65. Figure 10 shows the proportion of graduates from each university or college based in each GO quintile 15 months after graduation.

Figure 10: GO quintiles for graduates by university or college
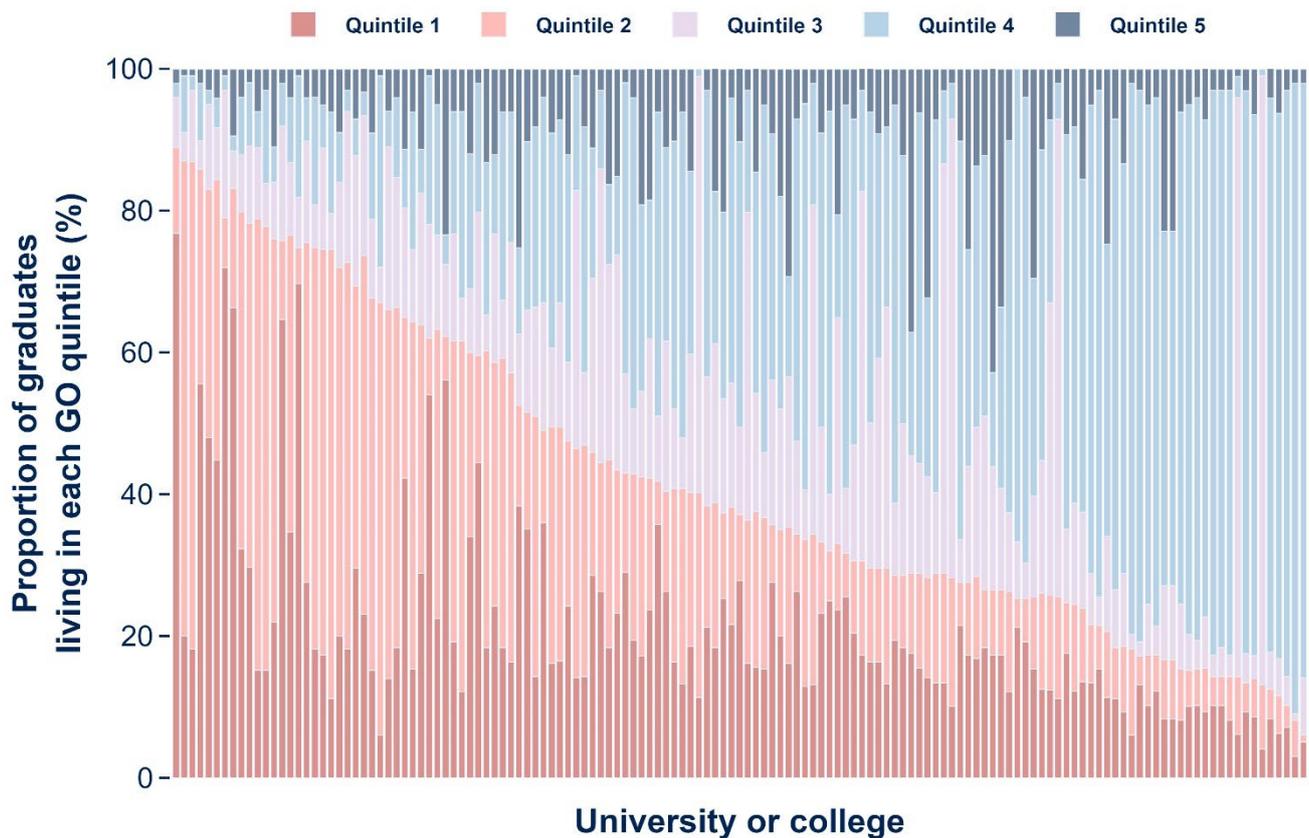
Note: Based on universities and colleges in England registered with the OfS. This figure shows those with at least 300 graduates in the GO population across the two years. The supplementary data tables also include data for smaller universities and colleges.

66. Figure 10 shows that there is a wide variety in the GO local graduate outcome quintiles across the sector. In some universities and colleges, almost all their graduates based in quintile 1 or 2 areas, whereas for others a very small proportion are based in such areas.

Comparison between groupings

67. In this section we compare the quintiles based on well-paid jobs using LEO data to those based on highly skilled employment using Graduate Outcomes data.

Figure 11: Map of LEO and Graduate Outcomes quintiles
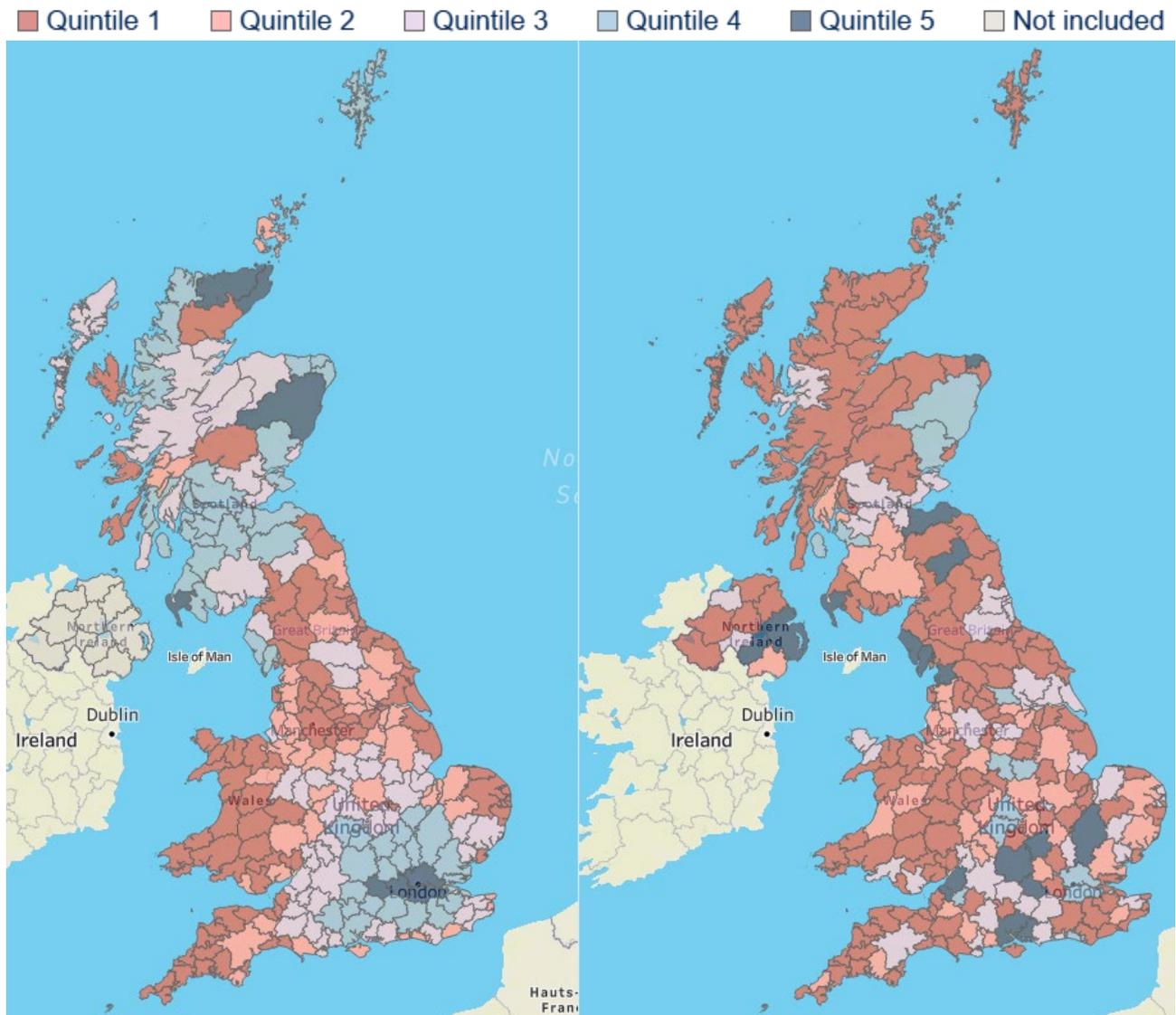
68. Figure 13 shows that while areas with highest proportions of graduates in well-paid jobs are mostly centred around London, the areas with the highest proportion in highly skilled jobs are spread more evenly across the country.

69. It is also important to note that the LEO quintiles cover a wider range of rates, whereas the GO quintiles are closer together. The difference in average rates between the top and bottom LEO quintiles is 21 percentage points (50.6 to 71.4), whereas the difference in average highly skilled employment rates between the top and bottom GO quintiles is 10 percentage points (67.2 to 77.1).

70. Figure 12 compares the two sets of quintiles. Each number relates to the number of TTWAs with each combination of LEO quintile and GO quintile.

Figure 12: Comparison of LEO grouping to GO grouping, by number of TTWAs

56%	8%	11%	0%	0%	LEO Q1 (75 areas)
25%	10%	5%	2%	3%	LEO Q2 (45 areas)
28%	12%	10%	4%	3%	LEO Q3 (57 areas)
17%	6%	10%	3%	8%	LEO Q4 (44 areas)
3%	0%	0%	2%	2%	LEO Q5 (7 areas)
GO Q1 (129 areas)	GO Q2 (36 areas)	GO Q3 (36 areas)	GO Q4 (11 areas)	GO Q5 (16 areas)	

71. Figure 12 shows that there are more TTWAs in the lowest GO quintile (129) than in the lowest LEO quintile (75). This shows that TTWAs with fewer graduates are more likely to be in the lowest quintile in terms of highly skilled employment than in terms of above-threshold earnings.

72. There is also relatively little consistency between the two groupings – areas in each of the LEO quintiles 2-5 were more likely to have a GO quintile of 1 than have the same as the LEO quintile.

Next steps

73. We anticipate that we will update this report next year, and expect to make three main changes:

    a. Updating the data sources. Using more recent data as it becomes available will also allow us to use three years of GO data rather than two.

    b. Improving the assignment of graduates to TTWAs. Using the full postcode and more information on the town or city of employment to increase the proportion we can assign to the area of their employer and improve the accuracy.

    c. Exploring whether we can create separate groupings using the GO survey data for postgraduate students.

74. In addition, the publication may include changes in response to feedback received following this second experimental statistic release or to related OfS consultations.

Feedback

This report is an experimental official statistic which falls under the official statistics' Code of Practice. We are actively seeking feedback for this analysis. Please email comments to Adam Finlayson at official.statistics@officeforstudents.org.uk.

In particular, we welcome feedback on the following aspects:

- Whether the TTWAs are suitable for this purpose

- Whether there are groups of students or types of provision which could be misunderstood using these quintiles

- Whether there may be unintended consequences from using these quintiles in combination with other student characteristics

- Whether students could benefit through us publishing further data.

Annex A: Further information on LEO data and definitions

75. The Longitudinal Education Outcomes (LEO) data is a dataset of education records joined to UK tax and benefits data. It shows whether graduates were in paid work or study, and how much they were paid. It includes people who were self-employed as well as those who worked for an employer.[21]

76. The LEO data also records where graduates lived during the tax year. We have used this to assign each graduate to a travel to work area and combine the outcomes for all graduates in each area.

77. The outcome measure we have used in this classification is based on:

- UK undergraduate qualifiers

- both full-time and part-time courses

- universities and colleges in England and universities in Wales and Scotland[22]

- graduates in sustained employment[23] with taxable UK earnings or further study three years after graduation.

It measures the proportion of these graduates who were:

a. **Earning over a threshold**. The threshold for each year is defined as the national median earnings for graduates and non-graduates aged 25 to 29 years[24], which in 2018-19 was £24,000. All graduates earning over this threshold will count positively towards the metric, whether they earned £25,000 or £100,000.

or

b. **In further study**. Any graduates studying on a course leading to a higher education qualification will count positively. Note that this is a change from the previous publication which only counted study as a positive outcome if it was at a higher level.

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[21] The LEO data used in this publication is derived from datasets owned by the Department for Education (DfE). The DfE does not accept responsibility for any inferences or conclusions derived from the LEO data by third parties.

[22] There are higher education graduates from colleges in Scotland and Wales, but these are not currently included in the core LEO dataset. These make up a small part of the sector in Wales but a significant part in Scotland. It is not clear how this impacts the results: while graduates from Scottish colleges may have lower earnings than those from Scottish universities, they are more likely to study at a higher level.

[23] Graduates are considered to be in sustained employment if they were employed for at least one day for five out of the six months between October and March of the tax year in question or if they had a self-employment record in that tax year.

[24] The median for national earnings is based on all 25 to 29-year-olds, including both graduates and non-graduates. The median for each financial year is drawn from the annual ONS/HMRC publication, Personal Incomes Statistics, and rounded to the nearest £500. The medians used in the other years were £22,000 in 2016-17 and £23,000 in 2017-18.

78. Note that graduates who are not in paid employment or study are not included in the measure. This is because LEO data does not record how they are spending their time and therefore the extent to which the lack of paid employment or study was a choice rather than an undesired outcome is unknown. This means the measure should not be used as a marker of the overall economic health of an area.

79. We have pooled three years of LEO data to increase the sample size and robustness. This analysis covers the financial years 2016-17, 2017-18 and 2018-19 which relate to the graduates who completed their course between August 2012 and July 2015. The total number of graduates is similar in each year, as is the overall proportion of graduates earning above the threshold or in higher-level study.

80. There have been slight changes from the last publication to both the population and the measure used.

    a. This population excludes some students because the qualification they were awarded normally has another undergraduate qualification as a pre-requisite for entry, making these qualifiers quite different from others included in this analysis.

    b. This population includes more qualifiers from non-recognised higher education courses[25] recorded on the ILR.

    c. The measure now counts further study at any level as a positive outcome rather than only study at a higher level.

81. Had we used the new methodology and population in the previous publication, 47 of the 218 TTWAs would have changed by one quintile.

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[25] For more information on what non-recognised higher education courses are, see Annex B of the HESES21 guidance, available at: www.officeforstudents.org.uk/publications/heses21/.

Annex B: Further LEO analysis of smaller sub-areas

82. This annex shows more information on the proportion of middle-level super output areas (MSOAs) which were in a different quintile to the surrounding travel to work area (TTWA), and how much of this can be explained by random variation due to the smaller size of the MSOAs.

83. Table B1 shows the proportion of MSOAs in each quintile compared to the quintile of the TTWA around them. For instance, 59 per cent of the quintile 1 MSOAs were in a quintile 1 TTWA.

Table B1: Comparison of LEO MSOA quintiles to the surrounding TTWA quintile

TTWA quintile	MSOA quintile					Number of MSOAs
	Q1	Q2	Q3	Q4	Q5	
1	59%	14%	19%	8%	1%	1,938
2	40%	17%	29%	14%	1%	1,599
3	25%	15%	29%	27%	4%	1,765
4	9%	6%	20%	45%	21%	1,977
5	1%	1%	8%	42%	48%	1,363

84. Table B1 makes it look like most of the time MSOA quintiles are different to the TTWA surrounding them. However, much of this variation is driven by the small population size of the MSOAs and the relatively narrow boundaries between quintiles.

85. To understand the extent to which we are seeing genuine differences rather than natural variation, we run simulations based to see what the variation would be if each MSOA had an underlying rate which was the same as the surrounding TTWA. First, for each MSOA the simulation generates a new proportion earning above the threshold or in further study from each area. This can be estimated from a binomial distribution: conceptually each graduate in the base population flips a (biased) coin which decides if they will have above-threshold earnings or not. The binomial distribution needs two parameters, N and p. These are estimated for each MSOA using the MSOA graduate population (for N) and the proportion in above-threshold earnings in the surrounding TTWA (for p). Every pass of the simulation therefore generates a new highly skilled employment rate for every MSOA.

86. Second, we use these simulated proportions to assign a new quintile to each MSOA by comparing it to the quintile thresholds defined by the TTWAs.

87. Each new set of quintiles generated by one pass of the simulation is compared to the quintile of the surrounding TTWA, to calculate the difference to the reference quintile for each MSOA. This is repeated for 2,000 simulated classifications to give stable summary statistics.

88. Table B2 shows the simulated results which result if the underlying rate for each MSOA was exactly the same as the TTWA, and there was typical (binomial) variation in the observed rate given the MSOA population size.

Table B2: Simulated results comparing MSOA quintiles to the surrounding TTWA quintile if underlying rates were identical

TTWA quintile	Simulated MSOA quintile					
	Q1	Q2	Q3	Q4	Q5	Number of MSOAs
1	62%	18%	17%	3%	0%	1,938
2	37%	23%	31%	9%	0%	1,599
3	18%	17%	39%	24%	2%	1,765
4	4%	5%	20%	54%	17%	1,977
5	0%	0%	1%	45%	54%	1,363

89. Taking the difference between these two tables gives an indication of the 'true' cases where MSOAs are different to their TTWA beyond random variation. Table B3 shows this difference.

Table B3: Difference between simulated results and actual results

TTWA quintile	Difference in proportions (pp)				
	Q1	Q2	Q3	Q4	Q5
1	-3%	-4%	2%	5%	1%
2	3%	-6%	-2%	5%	1%
3	7%	-2%	-10%	3%	2%
4	5%	1%	0%	-9%	4%
5	1%	1%	7%	-3%	-6%

90. Table B3 shows that relatively small numbers of MSOAs have a quintile difference beyond what you would expect given random variation. However, there are cases where MSOAs are clustered in a quintile which is different to that of the TTWA surrounding them. One example, where quintile 3 TTWAs have more MSOAs in quintile 1 than you would expect, is discussed above (see paragraph 43).

91. As on example, the number of MSOAs in quintile 1 but in a quintile 3 TTWA is higher than you would expect. Further exploration showed that this was often due to a cluster of quintile 1 MSOAs in the centre of a town or city in a quintile 3 TTWA.

Annex C: Assigning Graduate Outcome survey respondents to areas

92. This annex describes the method for assigning respondents to the Graduate Outcomes survey to the most appropriate travel to work area (TTWA).

93. Ideally this would be recorded consistently for all respondents, but to reduce burden on survey respondents not everyone is asked their precise location, and for those who are asked an answer is not compulsory. For this reason, there is a process of assigning each graduate to the most appropriate area based on the information recorded.

Method

94. The aim is to use the information provided about employment location, further study and prior home postcode to assign graduates to the most appropriate TTWA. We use the information provided by the graduate to assign them directly to a TTWA if possible, but if that is not possible we use other information to select the most likely area. We use the fact that most graduates return to their home region or stay in their study region.[26]

95. The following steps are carried out for each graduate, ordered from the closest match to the least likely match, and the best match is chosen.

   a. **Main location is abroad.** The graduate has reported that their main activity for the year was abroad.[27]

   b. **Direct match on town/city.** The graduate recorded their workplace town or city, and this is one of those listed in the TTWA name. For example, the graduate records their employment city as 'Clifton, Bristol', and because it contains 'Bristol' they are assigned to the Bristol TTWA.

   c. **Partial postcode match.** In cases where full or partial employment postcode was recorded, the first part of the postcode is used to assign a TTWA. If the partial postcode matched more than one TTWA, it is assigned to the one with the strongest supporting evidence (see below for an explanation of the supporting evidence).

   d. **Implied study postcode match.** If a graduate reports that they are studying at a provider in the UK, we assign them a TTWA based on the most common location for all students at that provider. If there is more than one common TTWA for students at the provider, the one with the strongest evidence is used.

   e. **Lower evidence matches.** If there is no strong evidence for any of the above matches, we accept weaker evidence to assign the graduate based on steps (c) and (d) from above. See below for more information.

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[26] See https://www.gov.uk/government/statistics/graduate-outcomes-leo-2018-to-2019.

[27] See HESA's technical specification at: https://www.hesa.ac.uk/collection/c18072/derived/xmlocgr.

    f. Prior home postcode. If none of the above steps have assigned a TTWA to the graduate, we assign them a TTWA based on the permanent home address recorded in our student data for their previous course.

96. The strength of the evidence to assign a graduate to a TTWA in parts (c), (d) and (e) is determined by its proximity to other TTWAs we know the graduate has a link to, and also a measure of how common it is for graduates to be in that TTWA.

    i. First, we check if it matches other TTWAs linked to the graduate. For instance, if a graduate is matched to two different TTWAs using their partial postcode (c above), we check if either of them is the same TTWA as their implied study TTWA (d above) or the graduate's previous home TTWA (f above). If so, we assign them to the matching TTWA.

    ii. If the TTWA does not **match** other TTWAs, we instead check whether it was close to those other TTWAs, using 15 miles as the definition of 'close'.

    iii. After that, we see which TTWA was more common for similar graduates. For instance, looking at TTWAs matched on partial postcode (c above), we consider which TTWA had more graduates with the same partial postcode.

97. If the TTWA is corroborated by other sources (i or ii above) or at least 50 per cent of the similar graduates are in that TTWA, this is considered 'strong evidence'. Such areas are accepted as matches for parts (c) and (d). If no TTWAs meet this threshold, but at least 20 per cent of the similar graduates are in that TTWA, it is considered weak evidence and accepted as a match for part (e). Otherwise it is not accepted as a match.

Results

98. Table C1 shows the proportion of graduates assigned to a TTWA using each type of match. It shows that just under half of the graduates matched directly using the employment town or city they reported, and another 16 per cent partially matched using the postcode or partial postcode.

Table C1: Proportion of graduates matched with each type of match

Match type	Number of graduates	Proportion
Main location is abroad	9,155	2%
Town or city name	226,455	48%
Partial employment postcode (strong evidence)	76,400	16%
Implied study postcode (strong evidence)	41,805	9%
Partial employment postcode (weak evidence)	155	0%
Implied study postcode (weak evidence)	1,910	0%
Home location	111,740	24%
Not able to assign a TTWA	240	0%
Total	**467,860**	**100%**

Annex D: Simulations to check stability of the Graduate Outcomes quintiles

99. This annex discusses simulations carried out to check the stability of the Graduate Outcomes quintiles and determine whether combining smaller areas is necessary.

100. An ideal classification would be stable if there is no change in the underlying graduate outcome rate. This analysis uses simulations to understand the probability of an area moving into a different quintile if different years of data were used but the underlying rate had not changed.

Method

101. First, for each travel to work area (TTWA) the simulation generates a new proportion in highly skilled employment or further study from each area. This can be estimated from a binomial distribution: conceptually each graduate in the base population flips a (biased) coin which decides if they will gain a highly skilled job or not. The binomial distribution needs two parameters, N and p. These are estimated for each TTWA using the TTWA graduate population (for N) and the TTWA proportion in highly skilled employment or further study (for p). Every pass of the simulation therefore generates a new highly skilled employment rate for every TTWA.

102. Second, these simulated proportions are used to assign a new quintile based on the new proportions for all the TTWAs.

103. Each new set of quintiles generated by one pass of the simulation is compared to the quintile originally assigned, to calculate the difference to the reference quintile for each TTWA. This is repeated for 2,000 simulated classifications to give stable summary statistics.

Results

104. Figure D1 shows the distribution of simulated quintiles for areas in each original quintile. Each row represents the distribution of the simulated quintiles for areas in each original quintile. For instance, for the areas originally in quintile 1, 88 per cent of the time those areas were still in quintile 1, and 9 per cent of the time they were in quintile 2.

Figure D1: Distribution of simulated quintiles for areas in each original quintile (Q)

Simulated GO Q1	Simulated GO Q2	Simulated GO Q3	Simulated GO Q4	Simulated GO Q5	
88%	9%	2%	0%	1%	Original GO Q1 (129 areas)
21%	59%	17%	1%	1%	Original GO Q2 (37 areas)
2%	21%	54%	12%	12%	Original GO Q3 (35 areas)
0%	1%	31%	42%	26%	Original GO Q4 (11 areas)
2%	2%	4%	8%	82%	Original GO Q5 (16 areas)

105. Figure D1 shows that the top and bottom quintiles were more stable than those in the middle quintiles. In particular, less than half of the simulations for quintile 4 areas ended up with them staying in quintile 4. This is due to the size of the areas and the narrow range of quintile 4 (0.9 percentage points) – a change in the rate of just 1 percentage point will always cause a quintile 4 area to change to a different quintile.

106. In comparison, Figure D2 shows the distribution if all areas containing fewer than 100 graduates with a known outcome were combined with the area or areas geographically closest to them until the combined area had at least 100 graduates. This process reduced the number of TTWAs from 228 to 205.

Figure D2: Distribution of simulated quintiles (Q) if small areas were combined until they had at least 100 graduates

Simulated GO Q1	Simulated GO Q2	Simulated GO Q3	Simulated GO Q4	Simulated GO Q5	
89%	9%	1%	0%	0%	Original GO Q1 (112 areas)
19%	62%	18%	1%	1%	Original GO Q2 (35 areas)
1%	21%	54%	12%	11%	Original GO Q3 (34 areas)
0%	1%	31%	42%	26%	Original GO Q4 (11 areas)
0%	0%	3%	9%	88%	Original GO Q5 (13 areas)

107. Figure D2 shows that combining the smaller areas does improve the stability, but not by much, and the results for quintile 4 areas do not change. Given that aggregating to 100 does not greatly improve the stability, and that crudely combining areas together would reduce precision, it is better to use the original areas.