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On the move: local opportunities and youth migration

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Abstract

Studies of geographical wage inequalities typically find a large role for worker sorting, but little is known about whether this reflects differences in educational attainment across places or selective migration after education. This paper uses administrative data linking school and tax records to study migration in people's early careers. Young workers in England are highly mobile, with 21 per cent living outside their area of origin by age 27, and 30 per cent by age 32. Migration up to age 27 is highly selective: high attainers are more likely to move, and (conditional on moving) more likely to move to high-paying places, in particular London. Migration patterns shift in people's late 20s and early 30s – with large outflows from London balancing out large inflows – but return migration is negatively selected and those leaving London tend to move to prosperous places in the South East. Migration increased in recent cohorts, especially among graduates.

KEYWORDS
youth, migration, geographical inequality

JEL CLASSIFICATION
J31, J61, R11, R12, R23

1 | INTRODUCTION

There are large and persistent differences in economic outcomes between places in the UK and many other countries (Bauluz et al., 2023). Recent years have seen an increased interest in geographical inequalities in both academic and policy circles, often mirroring widening spatial disparities (Diamond and Suárez Serrato, 2025). These disparities partly reflect the geographical sorting of workers by skill level: high-skilled workers are geographically clustered, and tend to live in places that pay higher

wage premiums (Dauth et al., 2022; Diamond and Gaubert, 2022; Overman and Xu, 2024; Card, Rothstein and Yi, 2025). Understanding why skills differ so much across places is therefore crucial to understanding geographical inequalities and identifying appropriate policy responses.

Geographical mobility is one potential source of worker sorting. Local economic opportunities are likely to affect where young people choose to live after finishing education. 'Brain drain' from poor-performing regions, towards places offering better opportunities, could widen skills gaps and limit the extent to which policies to improve local educational attainment benefit the local economy. At the same time, geographical mobility could be instrumental in providing opportunities for talented people who grow up in disadvantaged places.

This paper uses administrative data linking education records and labour market outcomes in England to study migration patterns in people's early careers. I find that young workers in England are highly mobile, with one in five (21 per cent) living outside their area of origin by age 27, and nearly a third (30 per cent) by age 32. Migration up to age 27 is highly selective: those with higher educational attainment are more likely to move, and – conditional on moving – more likely to move to places offering better labour market opportunities, such as London. Many leave cities to settle down in their late 20s and early 30s, but return migration is negatively selected, and those leaving London tend to move to other prosperous places in the South East. A third (34 per cent) of young workers who move to London by age 27 leave by age 32, but 44 per cent of those who leave move to a commuting zone that directly borders London, the majority of whom carry on working for the same firm. Migration has increased in England in recent cohorts, especially for graduates, which suggests that selective mobility is playing an increasing role in widening geographical inequalities.

I contribute to a large body of literature that decomposes geographical wage disparities into 'people' and 'place' effects (Combes, Duranton and Gobillon, 2008; Gibbons, Overman and Pelkonen, 2014; De la Roca and Puga, 2016; Dauth et al., 2022; Overman and Xu, 2024; Card, Rothstein and Yi, 2025), as well as a more recent strand of literature on the sorting of college/non-college workers across space (Moretti, 2013; Diamond and Gaubert, 2022; Diamond and Suárez Serrato, 2025). Decomposition studies have found that 70.7 per cent of the variation in log average wages across commuting zones in the United States, and 76.4 per cent in Germany, is explained by worker sorting (Dauth et al., 2022; Card, Rothstein and Yi, 2025). However, because these studies tend to rely on labour market data, which do not have information on individuals before they enter the labour market, little is known about whether such sorting is driven by differences in educational attainment between places, or selective migration after education (including people moving for their first jobs).

Whether sorting is driven by education or selective migration has important implications for policy. If migration plays a key role, then policies to raise educational attainment in deprived areas are unlikely to boost local economic performance on their own, as newly educated individuals will move to places offering better opportunities. Reducing economic disparities between places would therefore require industrial policies to boost job opportunities in deprived areas and to better retain and attract talent. My findings suggest that selective migration plays a key role in the sorting of young workers in England. The correlation between local wage premiums and average educational attainment, measured by place of residence at age 32, is 81 per cent higher than the correlation measured by place of origin.

The paper also contributes to the literature on patterns of internal migration. Much of this literature has focused on the US, where there has been a sustained decline in internal migration over the last few decades, with some data sources showing a particularly steep drop since the financial crisis (Cooke, 2011; Molloy, Smith and Wozniak, 2011, 2017; Jia et al., 2023). Perhaps surprisingly, there is only a weak correlation between migration and labour market outcomes in the US: young adults do not generally gain from migration (Johnson and Schulhofer-Wohl, 2019), migrants from struggling areas do not disproportionately move to more prosperous ones (Molloy, Smith and Wozniak, 2017), and migration responses to wages are very weak (Sprung-Keyser, Hendren and Porter, 2022). In contrast to the US literature, I find clear evidence of selective migration in England, with higher-skilled

individuals moving to places with better labour market prospects. Further, I find that migration has increased in England in cohorts graduating after the financial crisis.

Finally, I contribute to a small literature on youth migration in the UK, which tends to use survey data and often focuses on graduate migration (Faggian and McCann, 2009; Hoare and Corver, 2010; Communian and Jewell, 2018; Wielgoszewska, 2018; Dickey and Magante, 2024). Compared with these studies, the linked administrative data allow me to study migration at a much more disaggregated geographical level (commuting zones rather than government office regions), and to characterise skills beyond the simple graduate/non-graduate distinction.

The paper is structured as follows. Section 2 describes the data and defines some terms. Section 3 documents geographical differences in wages facing young workers, and differences in skills measured by educational attainment and estimated individual fixed effects. In Section 4, I present the main empirical results on selective migration, focusing on the oldest two cohorts in the data – those born in 1986 and 1987 – and examining migration patterns at the start of their careers (up to age 27) and into their early 30s. Changes in migration from the 1986 to 1997 birth cohorts are discussed in Section 5. Section 6 concludes.

2 | DATA

I use individual-level administrative panel data from Longitudinal Education Outcomes (LEO) dataset, which links tax records from HM Revenue and Customs to school records from the National Pupil Database, to further education records from the Individualised Learner Record and to university records from the Higher Education Statistics Authority. The data include all individuals from recent cohorts who attended publicly funded schools in England.[1] Earnings are recorded on a financial year basis, running from April to March the following year.

The oldest cohort in the LEO data sat their GCSE (age 16) exams in 2002 and were mostly born between September 1985 and August 1986. I refer to this as the 1986 birth cohort. The main results in Section 4 use the two oldest cohorts – the 1986 and 1987 birth cohorts – who were in their early 30s by the end of the panel. To estimate local wage premiums and to compare changes over time, I use the full dataset covering the 1986 to 1997 birth cohorts. Throughout the paper, age is inferred from financial year and GCSE cohort rather than based on actual dates of birth. Results 'at age 32' include people who are actually aged 32–33 at the end of that financial year. The coverage of the full dataset in terms of age and birth cohort is given in Figure A.1 in the online Appendix.

Information on place of residence in adulthood is available from the 2012–13 tax year onwards, and the latest available data are from 2020–21. I omit the last year of data and consider the period from 2012–13 to 2019–20 to exclude any temporary effects of the COVID-19 pandemic on location choices. Unless otherwise specified, all years refer to financial years, with 2012 referring to the 2012–13 financial year and so on. I further restrict the sample to those whose place of residence at age 16 is known – referred to throughout as their 'place of origin'.

I compute local wage premiums using the method in Card, Rothstein and Yi (2025), which uses firm-level moves, as explained in Section 3. As such, I restrict the sample to employees, excluding self-employed workers. I compute day wages at the main employer using information on the length of employment spells. The LEO data do not include information on hours worked, so I impose some further restrictions to exclude casual work (for example, part-time work alongside studies), in order to focus on people who have started their careers in a meaningful sense. First, for individuals with an undergraduate degree, I exclude observations before their graduation year. Second, for individuals without undergraduate degrees who enrol in further education, I exclude their first continuous spell of further education. Third, I exclude individuals earning less than the equivalent of 16 hours per week

[1] Information on place of origin is not available for students who went to private schools, roughly 8 per cent of students in each cohort.

TABLE 1 Sample sizes and restrictions

Restriction	All cohorts		2002–03 cohorts	
	Person–year obs.	Individuals	Person–year obs.	Individuals
All	43,088,520	6,710,811	6,468,098	930,739
Employee earnings	41,493,010	6,510,571	6,117,467	891,210
Day wages	40,320,235	6,226,891	5,931,091	857,855
Post-education	32,650,510	3,622,672	5,759,651	801,242
Earns ≥16 hours per week at minimum wage	27,646,990	2,462,615	5,192,058	664,215

on their age-specific minimum wage in that year. Wages are deflated using a consumer price index (CPIH) and expressed in 2015 prices unless otherwise stated. To limit the effect of outliers, wages are winsorised at the 99.5th percentile by cohort and year.

The LEO data do not contain information on workplace locations. Places are therefore defined by place of residence, not place of work. I focus on outcomes and mobility across 149 Travel to Work Areas (TTWAs) in England, which are constructed to approximate local labour markets based on the 2011 Census.[2] They are conceptually similar to US commuting zones, and I refer to them as 'local labour markets', 'areas' and 'commuting zones' interchangeably.

The LEO data include enterprise identifiers, but not information on local units or workplaces. I therefore define 'firms' as enterprise–region groups, treating all employees of the same enterprise who live in the same broad region as belonging to the same 'firm'.[3] In practice, there is a trade-off in the level of aggregation. Defining firms too widely – for example, at the enterprise level – risks understating disparities across places if enterprises systematically locate high-paying functions in some areas and low-paying functions in others (for example, headquarters in London and warehouses in the Midlands). Defining firms too narrowly – for example, as enterprise–commuting zone groups – risks overstating disparities by misattributing residential sorting as firm-level differences (for example, if high-paid employees of a firm in London choose to live in nearby Tunbridge Wells) and could also increase the uncertainty of estimated effects.

The final sample contains 27.7 million person–year observations on 2.5 million people across the 1986–1997 birth cohorts. The two oldest cohorts contain 5.2 million person–year observations on 0.7 million people. Total sample sizes and the impact of the restrictions imposed are shown in Table 1.

3 | GEOGRAPHICAL DIFFERENCES IN WAGES AND SKILLS IN ENGLAND

To describe patterns of youth migration, I characterise places by the economic opportunities they offer young people, measured by their local wage premium. This captures the wages that a given person would expect in one place as opposed to another – that is, holding constant their individual characteristics. This section sets out my approach to calculating local wage premiums. It also provides some background on geographical differences in wages and skills in England, before moving on to the main results on migration patterns in the following section.

[2] This generally requires that at least 75 per cent of people living in an area also work in the area, and at least 75 per cent of those who work in an area also live in the area.

[3] I use four broad regions, grouping together the following government office regions: London and surrounding commuting zones; other South East and South West; other East, East Midlands and West Midlands; and North East, North West and Yorkshire and Humber

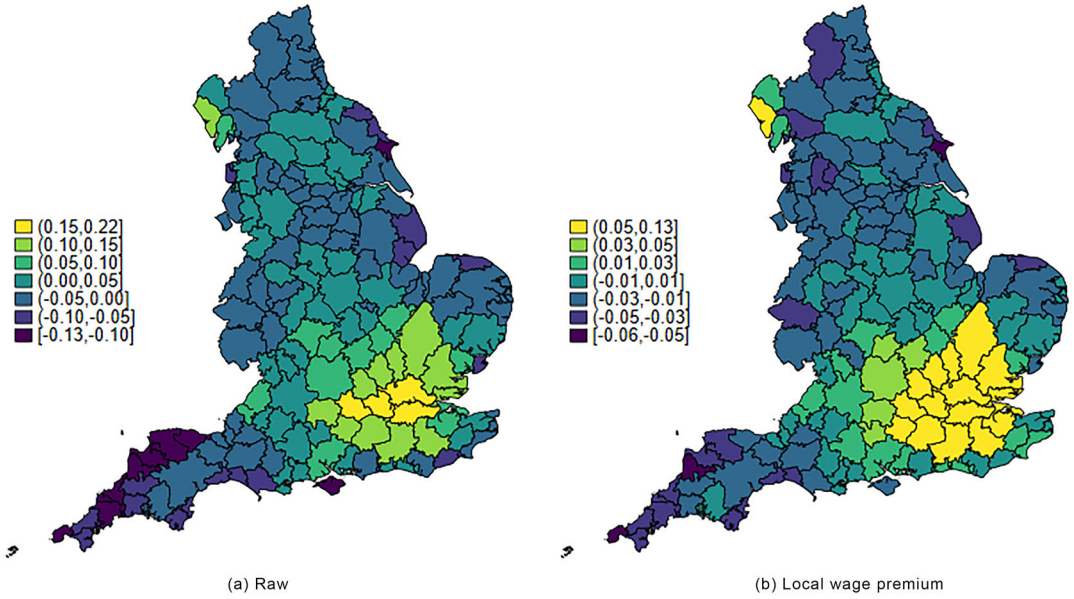

FIGURE 1 Wages by place of residence. *Note*: Panel (a) shows average log waves, and panel (b) shows estimated local wage premiums, both normalised to the unweighted average across all areas. [Colour figure can be viewed at wileyonlinelibrary.com]

3.1 | Wages and wage premiums

There are large differences in pay for young workers across England. Figure 1(a) shows differences in real pay across the 2012–19 period, relative to the average across all commuting zones. In Bridlington, young workers earned 13 per cent less than in the average commuting zone, whilst those in London earned 22 per cent more. Pay in Birmingham – England's second-largest city – was no higher than in the average area, and for young workers in Manchester pay was 1 per cent lower than the average across all areas.

Some of these differences in pay reflect who lives where. For example, only 29 per cent of young workers living in Bridlington had an undergraduate degree at age 27, compared to 45 per cent in London. To characterise the economic opportunities facing young people in different places, I calculate local wage premiums following the approach in Card, Rothstein and Yi (2025). This starts by estimating a two-way fixed effects model of (log) wages on individual and firm fixed effects, henceforth labelled the 'AKM' model after Abowd, Kramarz and Margolis (1999):

$$\ln(\text{wage}_{it}) = \mu_i + \delta_{j(i,t)} + X'_{it}\gamma + \epsilon_{it}. \tag{1}$$

Here, the individual effect μ_i captures the fixed attributes of a worker that affects their wages across jobs, such as their ability, motivation and ambition. The firm effect δ_j captures the wage premium (or penalty) to working for a given employer. Time-varying characteristics X_{it} include a quadratic in years of experience interacted with graduate status and year effects. The error term ϵ_{it} captures all other factors.

The local wage premium of commuting zone c is defined as the average firm effect experienced by workers living in that commuting zone over the sample period, weighted by the number of worker–firm observations:

$$\Psi_c = \frac{1}{N} \sum\nolimits_{c(i)=c} \delta_j(i). \tag{2}$$

As explained in Card, Rothstein and Yi (2025), this approach abstracts from changes in firm hierarchy experienced by movers – for example, if workers moving from low- to high-paying areas systematically move to lower-paying firms within the area, and vice versa – which may bias estimates of local wage premiums estimated from two-way fixed effects models with individual and place (as opposed to firm) effects.

The AKM model is a workhorse for a large literature on the role of firms in wage inequality. Clearly, it oversimplifies the wage-setting process. In its basic form, it does not allow for worker–firm interactions and is inherently static: firm effects are fixed over time, and wages depend only on the contemporaneous employer, not on employment histories or firm-specific returns to experience. Identification is based on wage changes of workers who switch firms, and ordinary least squares (OLS) estimation relies on the so-called 'exogenous mobility' assumption – job moves can depend on individual and firm fixed effects and time-varying controls, but not systematically on other components, for example worker–firm match effects or transitory wage shocks (which are captured by the error term).

Despite these simplifications, the AKM model provides a useful measure of firm quality for characterising the economic opportunities available in different places. Previous studies have found that firm effects and local wage premiums estimated from the basic model in equation (1) are not particularly sensitive to the inclusion of additional structure – such as worker–firm matches and place-specific returns to experience – and that firm effects are relatively stable over several years (Song et al., 2019; Lachowska et al., 2023; Card, Rothstein and Yi, 2025). Applying the tests developed by Card, Heining and Kline (2013) and Card, Cardoso and Kline (2016), I find no evidence of violations of the exogenous mobility assumption in the LEO data.[4] Finally, the assumptions of the AKM model are unlikely to materially affect the ranking of places by wage premiums. Overman and Xu (2024) show that AKM estimates of local wage premiums in the UK are highly correlated with estimates based on a Mincerian wage regression, and indeed with raw wage differences; in the LEO data, the correlation coefficient between raw wages and AKM wage premiums is 0.91.[5]

Estimated local wage premiums are shown in Figure 1(b). The variation in premiums is smaller than the variation in pay levels, but still substantial. Young workers can expect to earn 13 per cent more in London, and 12 per cent more in Slough and Heathrow, than in the average commuting zone.[6] The top ten highest-paying areas are all in or within commuting distance from London.[7]

My baseline specification estimates one local wage premium per commuting zone. However, returns to education could differ across places, leading to different local wage premiums by education level (Card, Rothstein and Yi, 2025). As a robustness check, I estimate equation (1) separately for graduates and non-graduates, and plot the two sets of wage premiums in Figure A.4 in the online Appendix. The variation in local wage premiums is twice as high for graduates than for non-graduates (variance 0.0019 as opposed to 0.0009), who see larger gains from living in London and the highest-paying commuting zones. However, the ranking of places is very similar, with a correlation coefficient of 0.91, consistent with previous research using survey data on the entire working age population (Overman

[4] Specifically, workers moving in opposite directions between groups of high- and low-paying firms experience wage changes that are approximately symmetric, which is consistent with the additive model (Figure A.2 in the online Appendix). Further, wages are generally stable in the years before the move, and workers moving between different groups of firms do not experience different pre-trends, as would be expected if workers moved in response to transitory wage shocks (Figure A.3 in the online Appendix). The only exception is movers from the top quartile of firms to the bottom quartile, who exhibit a slight downward trend in wages before the move – these moves are very rare, accounting for just 0.4 per cent of all moves.

[5] This is the unweighted correlation. All correlations and slopes at the commuting zone level are unweighted, unless otherwise stated. In general, estimates are higher when weighted by population size.

[6] The estimated London premium is higher than in Overman and Xu (2024), who estimate a fixed effect of 0.09 normalised to the average across all commuting zones. As set out in Egyei et al. (2025), this is likely to reflect both attenuation bias in the premiums in Overman and Xu (2024), which are estimated at the commuting zone rather than firm level, and a stronger role of firms in determining the wages of young people.

[7] The next eight commuting zones in order of local wage premiums are Southend, Guildford and Aldershot, Crawley, Luton, High Wycombe and Aylesbury, Chelmsford, Tunbridge Wells, and Medway.

and Xu, 2024).[8] Estimating equation (1) only on men – who are likely to work full-time, and therefore reducing the risk that estimated place effects reflect differences in the choice of working hours across places – yields very similar results to my baseline estimates, as shown in Figure A.5 in the online Appendix. The correlation coefficient is 0.97.

3.2 | Measures of skills

Studies on geographical wage inequalities tend to measure worker ability using estimated individual fixed effects $\hat{\mu}_i$ from equation (1) (e.g., Card, Heining and Kline, 2013; Dauth et al., 2022; Card, Rothstein and Yi, 2025). This is because most studies rely on linked employer–employee data, which do not contain direct measures of skills. Figure 2(a) plots average individual fixed effects by commuting zone, normalised around the average across all areas. Average individual fixed effects are relatively high in London and the South East, and relatively low in the North of England and in coastal areas.

By linking employer–employee data to school records, the LEO data contain direct measures of worker ability. School results provide a clear and transparent measure of skills that is determined prior to labour market entry, and therefore unaffected by job choices or subsequent labour market experiences. By contrast, individual fixed effects in the two-way fixed effects framework capture all persistent determinants of wages not explained by static firm effects or observables. If the model is misspecified – for example, if a person's first job has a persistent effect on their subsequent career trajectory, or if there are firm-specific returns to experience – these factors will be absorbed into the individual fixed effect, conflating innate skill with job histories. Moreover, using school results to measure skills mitigates limited mobility bias. This arises when a lack of moves between firms

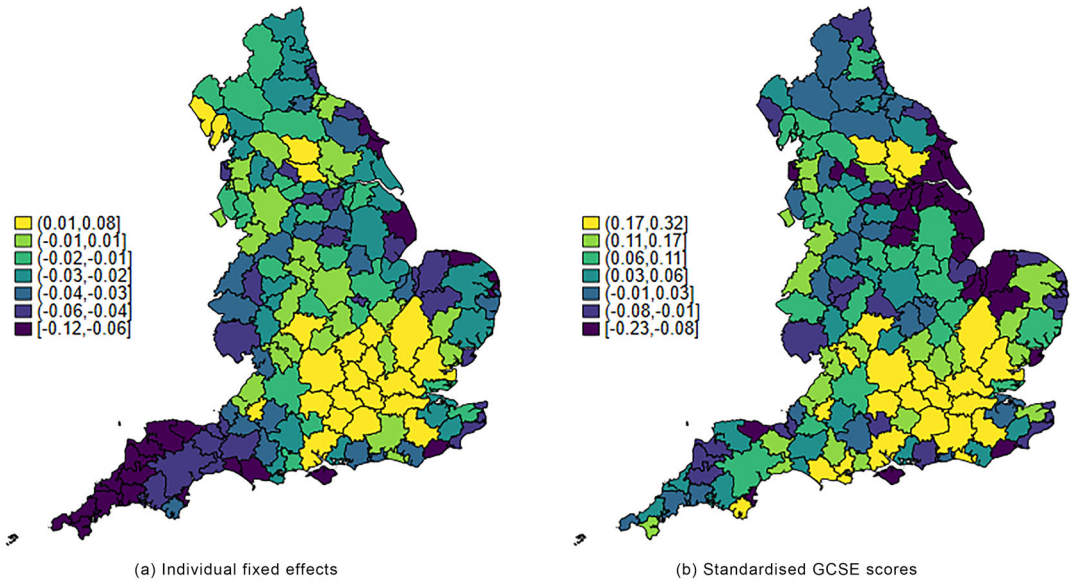

FIGURE 2 Skills by place of residence. *Note*: Panel (a) shows average individual fixed effects normalised to the unweighted average across all areas. Panel (b) shows average standardised GCSE scores. Areas are split into seven quantiles and colour coded by quantile. [Colour figure can be viewed at wileyonlinelibrary.com]

[8] An outlier is Whitehaven, a hub for the nuclear industry, which has a high wage premium for non-graduates but not for graduates. This is a very small commuting zone; the correlation coefficient weighted by population size is 0.98.

results in imprecise estimates of firm effects, which are mechanically offset by opposite errors in estimated individual effects, creating downward bias in the covariance between firm and individual effects (Andrews et al., 2008; Kline, Saggio and Sølvsten, 2020). In this context, using school results to measure skills avoids the mechanical negative correlation in estimation or measurement errors.[9] That said, school results may not capture certain skills (for example, social skills) that are captured by individual fixed effects.

My preferred measure is performance at GCSE (age 16) exams, for three reasons: it is available for all individuals in our sample; it is highly correlated with measures of general intelligence or IQ (Mackintosh, 1998; Deary et al., 2007); and it is highly predictive of future education and career success (Farquharson, McNally and Tahir, 2024). Compared to school results at later ages, it is less likely to be endogenous to migration intentions – for example, people may choose their university degree course based on the jobs available where they want to live. I use the total point score across all GCSE subjects, standardised by cohort.[10] Figure 2(b) plots average standardised GCSE scores by commuting zone. An alternative measure, based on a principal component analysis of performance measures at age 11 (Key Stage 2), exam results at age 16 and university degree courses, yields a very similar ranking of individuals (correlation coefficient 0.93).[11]

3.3 | Sorting

Both individual fixed effects and GCSE scores at the area level are correlated with local wage premium, as shown in Figure 3. That is, high-skilled young workers (using either measure) tend to live in places with high-paying firms.

The slope in a regression of average individual fixed effects on local wage premiums is 0.66 (standard error, s.e., 0.061) or 0.59 (s.e. 0.035) when weighted by population size. This is low compared to recent estimates in Dauth et al. (2022) and Overman and Xu (2024).[12] This is likely due to the relatively young sample in the LEO data, which means that many people are observed before selective migration has taken place. As shown in the next section, the correlation at age 32, after many

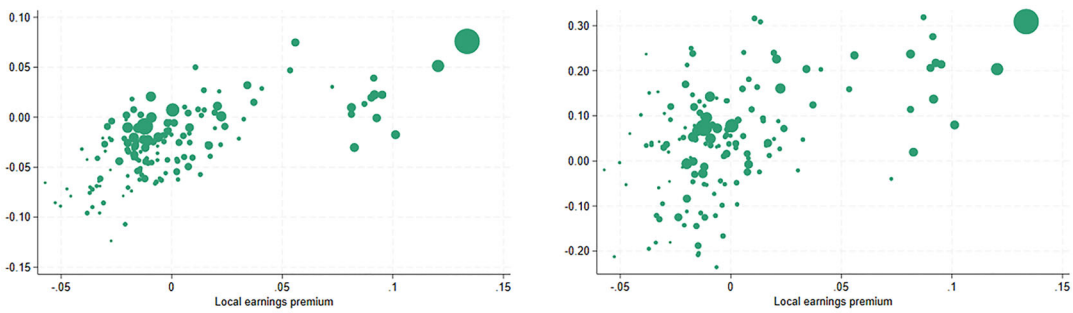

FIGURE 3 Correlation between skills (*y*-axis) and wage premiums (*x*-axis) by place of residence. *Note*: The *y*-axis in panel (a) shows average individual fixed effects at the area level, normalised to the unweighted average across all areas. The *y*-axis in panel (b) shows average standardised GCSE scores. The size of dots denotes population size. [Colour figure can be viewed at wileyonlinelibrary.com]

[9] A further mitigating factor in this context is that young people are highly mobile across firms, with 23 per cent of the sample moving firms every year, and 59 per cent of the sample having moved firms at least once in the 2012–19 period.

[10] This is the 'old style' point score that maps A* to G grades on to a numerical scale, and also includes GNVQ subjects.

[11] This is based on joint work with Matthew Oulton, with details available upon request.

[12] Dauth et al. (2022) find a weighted slope of 1.30 in Germany using data from 2008–14. The unweighted slope in Overman and Xu (2024) is 2.01, but this is likely to be inflated by attenuation bias in their local wage premium estimates.

people have settled down into a more permanent location, is in line with previous estimates. The next section documents patterns of migration in people's early careers and examines how this contributes to observed patterns of sorting.

4 | EMPIRICAL RESULTS ON SELECTIVE MIGRATION

To examine patterns of migration in people's early careers, I focus on the two oldest cohorts in LEO: those who sat their GCSE exams in 2002–03 (approximately the 1986–87 birth cohorts), who were 32–33 years old in the latest year before the pandemic. I consider migration in two stages of life: at the start of people's careers, up to age 27, and in their early 30s, a stage of life when many have children and begin to settle down. The analysis builds on previous work in Britton et al. (2021), extending it to mobility in people's early 30s and explicitly considering the role of mobility in driving observed patterns of sorting.

Young workers in England are highly mobile, as shown in Figure 4, which plots the share of these cohorts who live outside their area of origin by age. By age 27, a fifth (21 per cent) live in a different commuting zone from the one in which they lived at age 16, and by age 32 nearly a third (30 per cent) of them do. Graduates are particularly mobile, with 44 per cent living outside their home town by age 32, compared to just 21 per cent of non-graduates.

4.1 | Migration between age 16 and 27

Mobility at the start of people's careers is highly selective, with high-skilled people moving to high-paying cities. Figure 5 plots net migration at age 27 against local wage premiums by commuting zone, where net migration is defined as the difference between inflows and outflows between ages 16 and 27, as a share of local residents at age 16. The net migration rate of graduates of 0.46 in London implies that by age 27, there are 46 per cent more graduates living in London than the number of people from London, in the same cohorts, who go on to get a degree.

There is a clear positive relationship between migration and local economic opportunities for graduates. The slope in a regression of net migration on local wage premiums is 2.19 (s.e. 0.46). This reflects both graduates who leave places that offer poor opportunities, and graduates who move to places that offer better opportunities – the slopes of in- and out-migration with respect to local wage premiums are 1.02 and −1.17, respectively (see Figure A.6 in the online Appendix). In contrast, non-

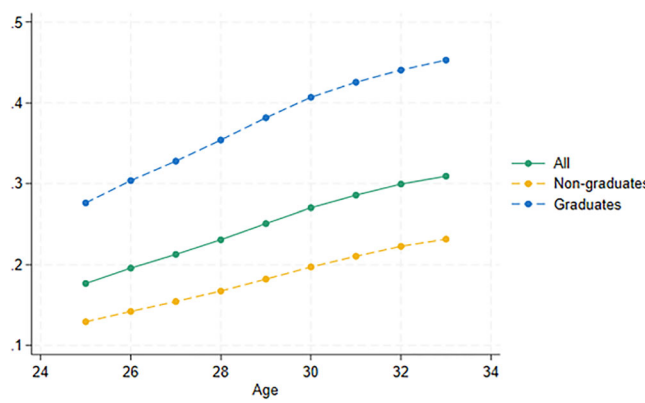

FIGURE 4 Migration by age. *Note*: This figure shows the share of people living outside their area of origin (age 16) at different ages, by whether or not they have an undergraduate degree. [Colour figure can be viewed at wileyonlinelibrary.com]

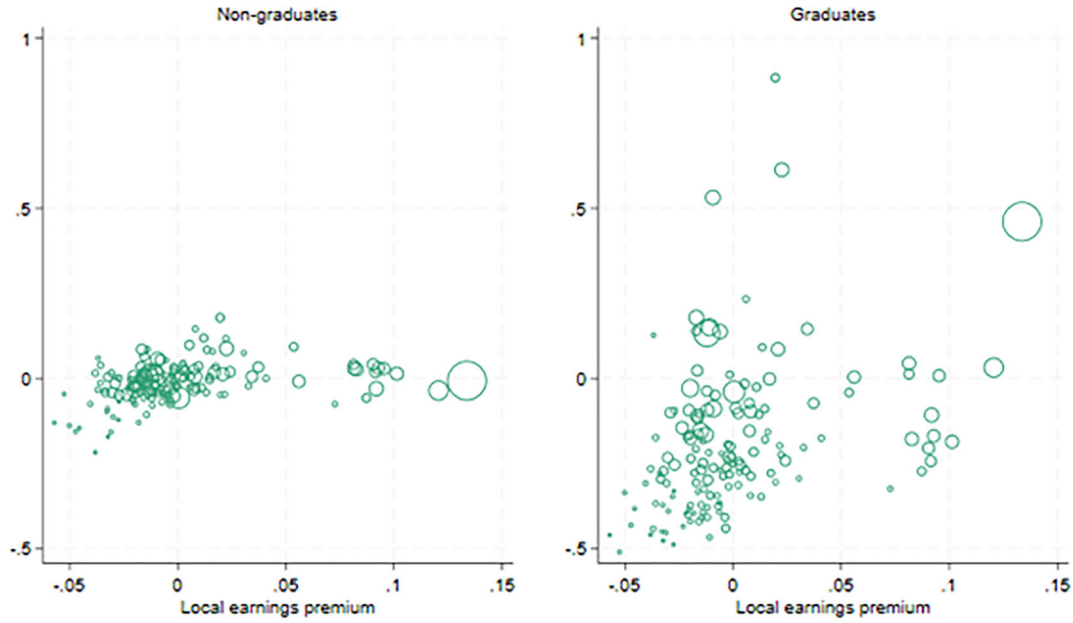

FIGURE 5 Correlation between net migration (vertical axis) and local wage premiums (horizontal axis), ages 16–27. *Note*: Size of bubbles denotes total resident population of 1986–87 birth (2002–03 GCSE) cohorts at age 16. Premiums normalised to unweighted average across all commuting zones. Outliers for graduates are Brighton (0.89 net migration), Bristol (0.61) and Leeds (0.53). [Colour figure can be viewed at wileyonlinelibrary.com]

graduate migration does not appear to be driven by local economic opportunities. The slope is 0.57 (s.e. 0.13), and net migration to London and Slough and Heathrow, the two highest-paying commuting zones, is slightly negative.

Early-career moves for graduates also tend to be towards cities. This can be seen in Figure 5, where the size of dots represents population size. At any given level of earnings premium, larger commuting zones experience higher net migration of graduates. Again, this pattern is driven by both in- and out-migration: at any given premium, larger areas draw in more migrants and lose fewer residents to out-migration (Figure A.6 in the online Appendix).

These flows are shown in more detail in Figure 6, which plots flows of movers between London, other major cities, smaller cities and rural areas. Cities are defined based on the Primary Urban Areas listed by the Centre for Cities, and the nine largest cities outside London are labelled 'other major cities'. Graduate flows out of London are rare, and flows into London are substantial, with over a quarter (28 per cent) of movers from outside London moving to the capital. Moreover, 37 per cent of all graduate movers come from rural areas, but only 19 per cent move to rural areas.[13] Note that 43 per cent of the variation in net graduate migration across commuting zones can be explained by the local wage premium and (log) population size.[14] Unlike graduates, non-graduates are just as likely to move into rural areas as they are to leave them: the distribution of movers across area types is virtually identical at ages 16 and 27.

Figure 7 shows that there is a clear pattern of selective mobility in early career moves – of higher-skilled workers moving to higher-paying areas – going beyond the simple graduate/non-graduate distinction. Panel (a) shows that for young people who are not from London, the probability of moving

[13] All commuting zones not considered a Primary Urban Area by the Centre for Cities are labelled 'rural'. This includes commuting zones containing towns such as Grimsby or small cities such as Bath.

[14] This is the R^2 from an unweighted regression of net migration on local earnings premium and log population size at age 16.

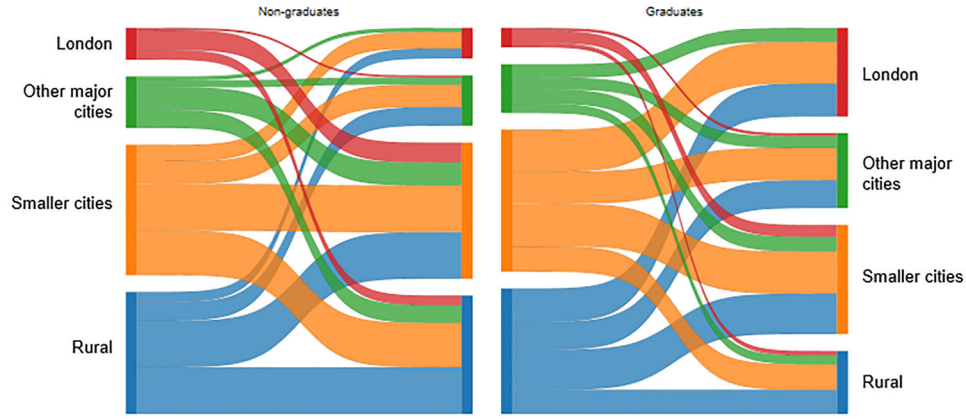

FIGURE 6 Flows of movers across area types, age 16 (left) and age 27 (right). *Note*: In each panel, the left-hand side shows the distribution of movers across area types at age 16 and the right-hand side shows the distribution at age 27, with flows showing where they move from/to. Non-movers are not shown on this graph. [Colour figure can be viewed at wileyonlinelibrary.com]

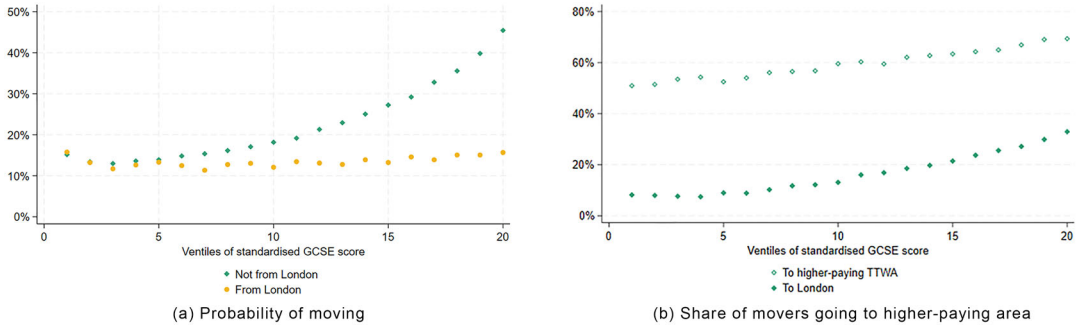

FIGURE 7 Probability of moving (left) and share of movers moving to a higher-paying commuting zone (right), by GCSE ventile, ages 16–27. *Note*: Overall GCSE scores are standardised at the cohort level. Panel (b) excludes those from London. [Colour figure can be viewed at wileyonlinelibrary.com]

increases steeply with educational attainment. Just one in seven (14 per cent) of those in the bottom fifth of GCSE scores live outside their area of origin at 27, compared with nearly half (45 per cent) of those in the top twentieth. In contrast, there is no relationship between educational attainment and the propensity to move for young workers from London.

Not only are higher-educated young people more likely to move, they are also more likely to move to places offering better economic opportunities. Figure 7(b) shows that for movers in the top twentieth of GCSE scores, more than two-thirds (69 per cent) move to a commuting zone with a higher local wage premium and a third (33 per cent) move to London. In contrast, movers in the bottom fifth of GCSE scores are as likely to move to a lower-paying area as they are to move to a higher-paying area, and only 8 per cent move to London.

Early-career mobility brings the very highest-educated workers into London, and 13 per cent of those in the top twentieth of GCSE scores come from London – just slightly more than would be expected given London's population share (12 per cent in these cohorts). By age 27, the share of the highest-educated workers living in London nearly doubles to 24 per cent.

TABLE 2 Mobility trajectories at ages 16–27 and 27–32

	Non-graduate	Graduate	Total
Stay, stay	75 per cent	52 per cent	67 per cent
Stay, move	10 per cent	16 per cent	12 per cent
Move, stay	10 per cent	20 per cent	13 per cent
Move, return	3 per cent	4 per cent	3 per cent
Move, move onwards	3 per cent	9 per cent	5 per cent

4.2 | Migration between age 27 and 32

The previous subsection showed that high-skilled people move to high-paying cities at the start of their careers. However, people may choose to move out of cities and return to their home towns as they get older. Indeed, net migration into London is positive only among people in their 20s; in recent years, outflows of 30- to 44-year-olds from London have exceeded inflows of 20- to 29-year-olds (Stansbury, Turner and Balls, 2023). This subsection examines mobility between ages 27 and 32, a stage of life when many people settle down, buy their first home and have children.[15]

The analysis is restricted to individuals who are employed at both 27 and 32, who make up 83 per cent of the sample in the previous section. As Table A.1 in the online Appendix shows, the two samples are very similar in terms of demographic characteristics, educational attainment and mobility. Those who are employed at both 27 and 32 have slightly (2 per cent) higher wages at age 27, but the degree of geographical earnings inequality at age 27 – as measured by the variance of log average wages across commuting zones – is nearly identical across the two groups.

Young workers in England continue to be highly mobile between ages 27 and 32, as shown in Table 2. One in five (20 per cent) live in a different commuting zone at age 32 from the one in which they lived at age 27. Of those who stayed in their area of origin at age 27, 15 per cent live in a different area at age 32. This share is much higher for graduates: a quarter (24 per cent) of stayers in the first period move in the second. Of those who moved to a different commuting zone by age 27, 37 per cent move again between ages 27 and 32. This share is similar for graduates and non-graduates, but non-graduates are more likely to return to their area of origin (17 per cent of movers compared to 12 per cent), whereas graduates are more likely to move to a new commuting zone (27 per cent compared to 19 per cent). I refer to the former group as ‘returners’ and the latter group as ‘onward movers’.

Whilst the overall rate of mobility between ages 27 and 32 is similar to the rate between ages 16 and 27, patterns of mobility are very different. Figure 8 plots the correlation between net migration at this later stage and local wage premiums. Graduates no longer flock to high-paying places as they did at the start of their careers. The slope in a regression of net migration on local wage premiums is 1.19 (s.e. 0.23), just over half the slope at age 16–27. In particular, net graduate migration to London is close to zero in this period – just 3 per cent, compared to 46 per cent between ages 16 and 27. Weighted by population size, the slope of net migration with respect to local wage premiums is 0.38 (s.e. 0.10) at age 27–32, compared to 2.61 (s.e. 0.32) at age 16–27.

Furthermore, graduates in their late 20s and 30s do not tend to move to cities. Figure 9 shows that the distribution of graduate movers across area types is similar at ages 27 and 32. There are large inflows into London – 17 per cent of all graduates who move go to London (20 per cent of movers from outside London) – but these are balanced by large outflows from London, consisting of 15 per cent of all graduate movers. Other major cities show a similar story – the next nine largest cities make up 17 per cent of all graduate outflows and 18 per cent of all inflows.

[15] Data from the UK Household Longitudinal Study show that for people born between 1975 and 1990, two-thirds (66 per cent) had children by age 32 (77 per cent of non-graduates and 53 per cent of graduates). Cribb (2019) finds that around 40 per cent of those born in the late 1980s owned their home at age 30.

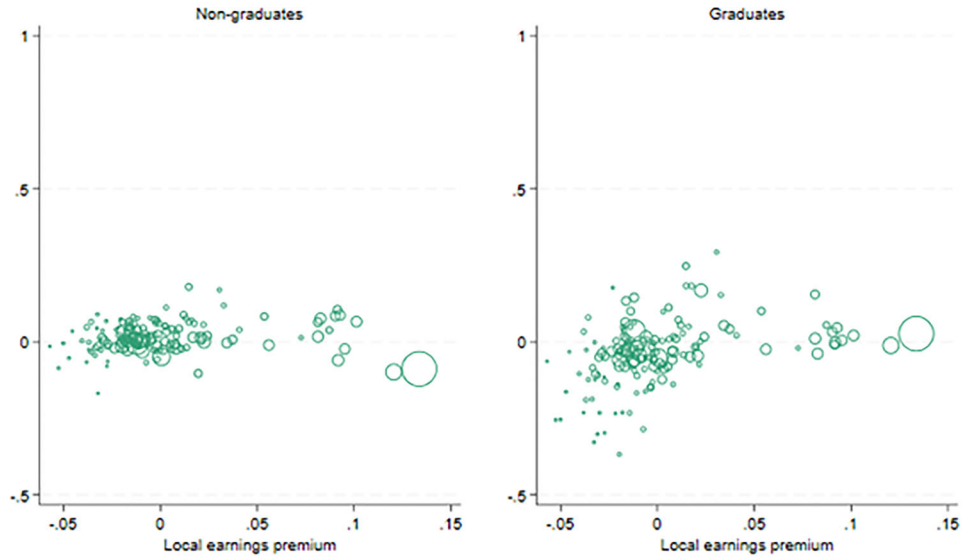

FIGURE 8 Correlation between net migration (vertical axis) and local wage premiums (horizontal axis), ages 27–32. *Note*: Size of bubbles denotes total resident population of 1986–87 birth (2002–03 GCSE) cohorts at age 16. Premiums normalised to unweighted average across all commuting zones. [Colour figure can be viewed at wileyonlinelibrary.com]

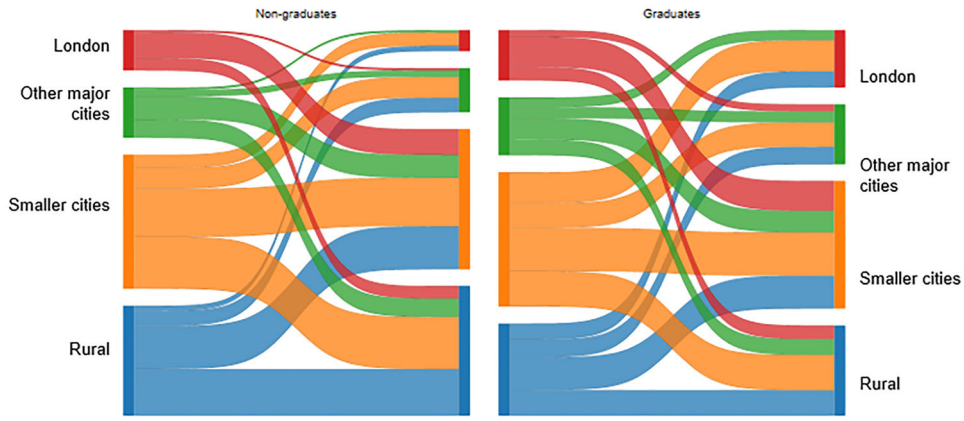

FIGURE 9 Flows of movers across area types, age 27 (left) and age 32 (right). *Note*: In each panel, the left-hand side shows the distribution of movers across area types at age 16 and the right-hand side shows the distribution at age 32, with flows showing where they move from/to. Non-movers are not shown on this graph. [Colour figure can be viewed at wileyonlinelibrary.com]

Seeing as many young people move out of cities between ages 27 and 32, with one in seven (14 per cent) of those who moved before age 27 now returning to their area of origin, one might expect migration in this later phase to undo some of the sorting that happens through earlier moves. In fact, this is not the case: migration between ages 27 and 32 further increases geographical inequalities.

There are three key reasons for this. First, many high-skilled people move for the first time after age 27, and move in similar ways to high-skilled people at earlier ages. Among this group, high-skilled workers are more likely to move to high-paying commuting zones, exacerbating geographical inequalities. Second, return migration is negatively selected, with low-skilled people being more likely

to return to their commuting zone of origin. Third, whilst many of those who move to London at the start of their careers leave the capital by age 32, they mostly move to other prosperous areas in the South East. I consider each of these factors in turn.

4.2.1 | Many high-skilled people move for the first time after age 27

As set out above, a quarter (24 per cent) of graduates who lived in their area of origin at age 27 live in a different commuting zone at age 32. This implies that many high-skilled people move for the first time between ages 27 and 32.[16] Figure 10, which plots the distribution of GCSE scores across different groups of movers, shows that these 'first-time movers' ('Stay, move') are similar in terms of educational attainment to those who move by age 27 ('Move by age 27').

These first-time movers also move in similar ways to earlier movers, with higher-educated workers moving to higher-paying commuting zones. This is shown in Figure 11, where the left panel shows movers between 16 and 27 (equivalent to Figure 7b) and the right panel shows people moving for the first time after age 27. Patterns across the two groups are very similar. Among the latter group, 62 per cent of those in the top GCSE ventile move to a commuting zone with a higher local earnings premium and 28 per cent move to London. For those in the bottom ventile, the figures are 40 per cent and 4 per cent respectively. In other words, many people are moving for the first time between ages 27 and 32, and they look like earlier movers and move in similar ways, continuing earlier patterns of sorting.

4.2.2 | Return migration is negatively selected

Of those who move by age 27, one in seven (14 per cent) return to their area of origin by age 32. One might expect this to undo some of the sorting from earlier moves. In practice, however, this does not have a big effect, as returners are more likely to be low-skilled.

Table 2 shows that return migration is more common among non-graduates: more than one in six (17 per cent) non-graduate movers return to their area of origin by age 32, compared with fewer than one in eight (12 per cent) graduate movers. Figure 12, which goes beyond the graduate/non-graduate

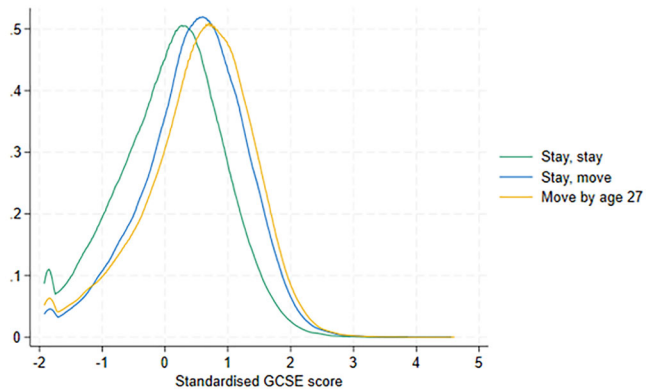

FIGURE 10 Distribution of GCSE scores by mobility trajectory. *Note*: (Stay, stay) refers to people who lived in the same commuting zone at age 27 as at 16; and at age 32 as at 27. (Stay, move) refers to those who lived in the same area at age 27 as at 16; but in a different area at age 32 than at 27. [Colour figure can be viewed at wileyonlinelibrary.com]

[16] It is possible that some of this group will have left their area of origin and returned by age 27. Unfortunately, location data are only available in LEO from 2012 onwards, when these cohorts were aged 26–27, so I refer to them as 'first-time movers' for brevity.

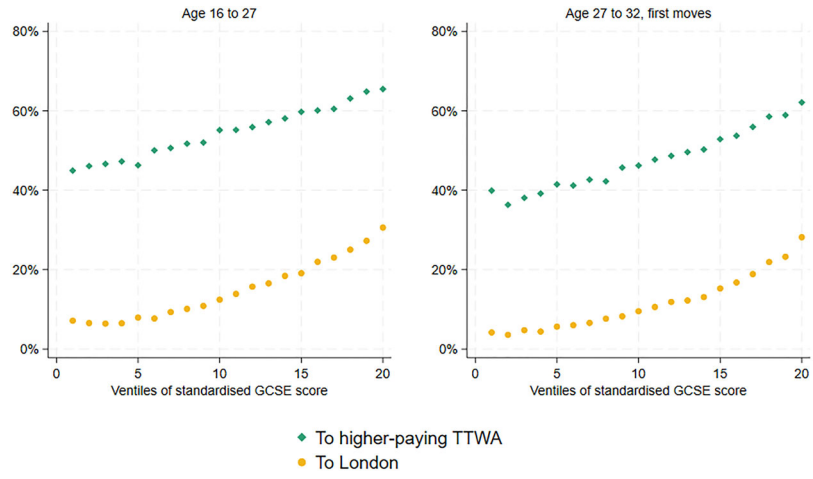

FIGURE 11 Distribution of GCSE scores by mobility trajectory. *Note*: Overall GCSE scores are standardised at the cohort level. Excludes movers from London. [Colour figure can be viewed at wileyonlinelibrary.com]

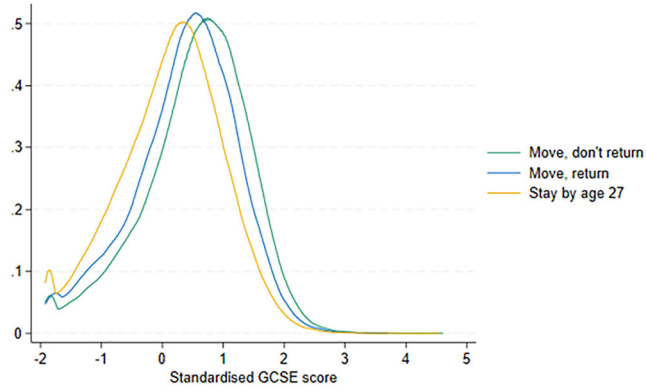

FIGURE 12 Distribution of GCSE scores by mobility trajectory. *Note*: (Move, return) refers to people who lived in a different commuting zone at age 27 than at 16; but were back in their age-16 commuting zone at age 32. [Colour figure can be viewed at wileyonlinelibrary.com]

distinction, shows that GCSE attainment is lower among returners than among migrants who do not return (though still higher than those who do not move by age 27). Furthermore, return migration is somewhat more common among those from higher-paying areas, as shown in Figure A.7 in the online Appendix. 18 per cent of graduates from London who leave by age 27 return to London by age 32. Looking across the top 10 commuting zones in terms of local earnings premiums (including London), 13 per cent of graduate migrants return by age 32. In contrast, of graduates who move out of the lowest-paying 10 commuting zones in their early careers, only 7 per cent return.

4.2.3 | Movers from London go to prosperous areas in the South East

Finally, although many workers who moved to London by age 27 leave the capital by age 32, they tend to move to already-prosperous areas in the South East, not to low-paid parts of the country.

One in five (19 per cent) young workers living in London at age 27 move elsewhere by age 32, including one in three (34 per cent) of those who are not originally from London. Of the latter group,

the majority (62 per cent) move to a commuting zone that is not their area of origin. People who move to London in their early 20s and leave by their early 30s are a very highly educated group, both compared with other movers and with London residents at age 27. As shown in Table 3, three quarters (72 per cent) have an undergraduate degree, and a quarter (26 per cent) scored in the top 5 per cent of their GCSE cohort. 44 per cent of this group move to commuting zones that border London, which are places that already have high levels of pay: on average, young workers can expect to earn 9 per cent more in these areas than in the average commuting zone.[17]

Figure 13 maps the number of movers to London between ages 16 and 27 (left) and the number subsequently leaving London between ages 27 and 32 (right),[18] by commuting zone as a percentage of all residents at the start of the period. In both cases, figures are scaled by the total number of movers (to and from London, respectively) as a percentage of the total population, which allows both maps to be shown on the same scale. A value of 1 implies that a commuting zone has as many movers to (left) as from (right) London, as you would expect if movers were randomly distributed.

A striking feature of Figure 13 is that moves from London are much more spatially concentrated than moves to London at the start of people's careers. In this way, London redistributes talent from the

TABLE 3 Educational attainment by move trajectory

	All movers	All London residents	All movers from London	All movers from London, not from London
Five A+ at Key Stage 4	21 per cent	20 per cent	20 per cent	35 per cent
Top 5% GCSE scores	16 per cent	16 per cent	16 per cent	26 per cent
Graduate	50 per cent	52 per cent	52 per cent	72 per cent
N	110,340	76,840	76,845	6,870

Note: The third column includes workers who lived in London at age 27 but not at 32. The fourth column is a subset of these workers, who did not live in London at age 16. *N* is rounded to the nearest 5.

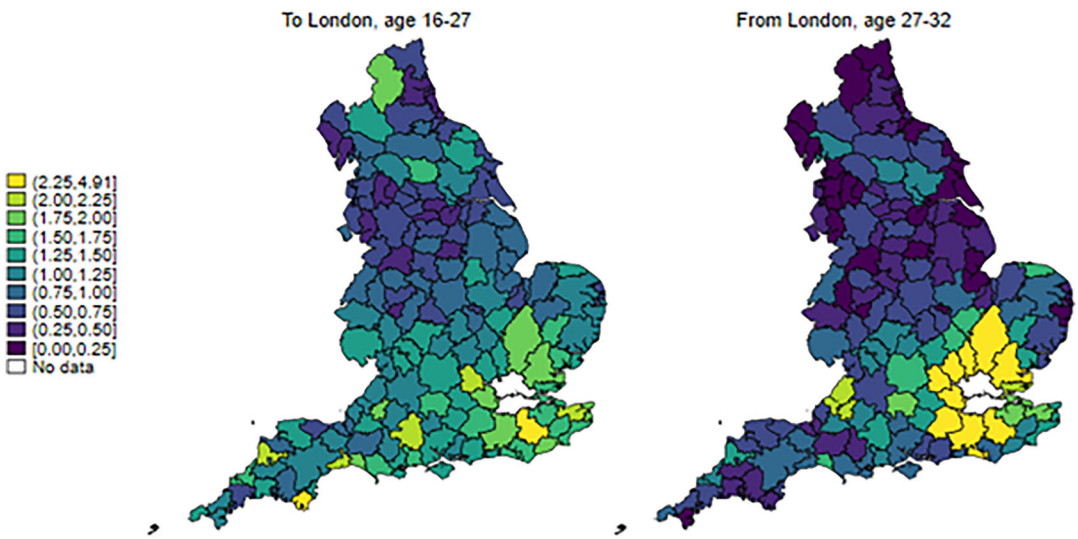

FIGURE 13 Origins of movers to London aged 16–27 and destinations of return and onward movers from London aged 27–32. *Note*: This figure shows the number of migrants to (from) London in an area as a share of the population of that area at the start of the period, scaled by the total number of migrants as a share of the total population. [Colour figure can be viewed at wileyonlinelibrary.com]

[17] This is the unweighted average local earnings premium across the commuting zones that border London.

[18] That is, returners and onward movers from London using the classification in Table 2.

rest of the country to the South East. Skilled workers from all over the country move to London at the start of their careers, and subsequently move to places just outside London. This is not true of other cities – for example, Manchester, which mainly draws early-career workers from neighbouring areas and moves them back out to neighbouring areas in their early 30s (Figure A.8 in the online Appendix).

It is worth noting that the maps in Figure 13 show workers by place of residence, not place of work. Two-thirds (66 per cent) of workers who move from London to a neighbouring area between ages 27 and 32 stay at the same enterprise in the year of the move. It is likely that many remain in the same workplace and commute to London (as noted in Section 2, the LEO data do not contain information on local units, so we cannot tell whether people are commuting to the same workplace or moving to another branch of the same enterprise). As such, benefits to commuting zones bordering London may not accrue to firms in these places, though providers of local services will benefit from higher spending power.

4.3 | Contribution of selective migration to sorting

The analysis above shows that migration patterns in early careers are shaped by the geography of economic opportunity. High-skilled young people move to cities offering high pay premiums at the start of their careers, and do not return to low-paid places in their early 30s.

The contribution of migration to sorting can be seen in Figure 14, which plots the correlation between local wage premiums and average local skills before and after migration. The yellow diamonds in Panel (a) plot average GCSE scores by area of origin (before migration), and the green dots plot average GCSE scores by area of residence at age 32 (after migration). Regressing the latter on local wage premiums yields a slope of 1.87 (s.e. 0.26) and an R^2 of 0.25. In contrast, average GCSE scores by place of origin are much less correlated with local wage premiums, with a slope of 0.88 (s.e. 0.25) and an R^2 of 0.08. The pairwise correlation by place of residence is 0.505, 81 per cent higher than by place of origin (0.278). Selective migration plays a key role in worker sorting for young workers in England.

It is worth noting that the local wage premiums in Figure 14 are based on the realised data and therefore incorporate people's actual migration choices. Local wage premiums are likely to reflect the local composition of skills, for example through endogenous agglomeration or human capital externalities (Glaeser and Gottlieb, 2009; Diamond, 2016). As such, the correlation between local wage premiums and skills by place of origin (the yellow diamonds) should not be interpreted as the extent of sorting in the absence of migration. To the extent that we expect a higher concentration

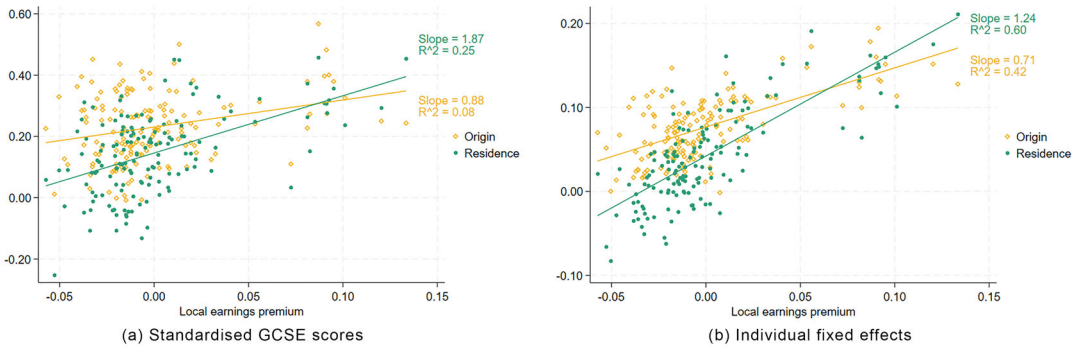

FIGURE 14 Contribution of migration to correlation between local skills (*y*-axis) and wage premiums (*x*-axis). *Note*: The *y*-axis in panel (a) shows average individual fixed effects at the area level, normalised to the unweighted average across all areas. The *y*-axis in panel (b) shows average standardised GCSE scores. [Colour figure can be viewed at wileyonlinelibrary.com]

of skills to increase local wage premiums – that is, if high-skilled migration raises productivity in destination areas and reduces it in sending areas – we would expect the slope of educational attainment at origin, regressed on counterfactual wage premiums in a world where no one moved, to be lower than 0.88.

For completeness and for comparability with the existing literature, Panel (b) of Figure 14 plots the correlation between average individual fixed effects, by place of origin and residence, and local earnings premiums. Regressing average individual fixed effects by place of residence on local wage premiums yields a slope of 1.24 (s.e. 0.08) and an R^2 of 0.60, comparable to previous estimates based on the full working-age population from the UK and Germany (Overman and Xu, 2024; Dauth et al., 2022). In contrast, average individual fixed effects based on place of origin are much less correlated with local wage premiums, with a slope of 0.71 (s.e. 0.07) and an R^2 of 0.42. Interpretation is not straightforward, however: not only are local wage premiums likely to be affected by migration, so too are individual fixed effects, as these will capture location-specific returns to experience and human capital investments made after compulsory schooling (for example, the choice of university degree) which depend on migration choices and intentions.

5 | CHANGES IN MIGRATION ACROSS COHORTS

The empirical results in Section 4 are based on the two oldest cohorts in the LEO data, who were born in 1986–87 and were 32–33 years old in the latest pre-pandemic data. This section considers whether rates and patterns of mobility changed in more recent cohorts, using the full LEO dataset from 2012 to 2019.

Figure 15 shows the share of workers living outside their area of origin by age and birth cohort, with the oldest cohorts in dark purple and the youngest in bright yellow. It shows that in every cohort, mobility increases with age, with a steepening of the slope at age 21 when graduates (who are more mobile) enter the labour market. What is striking is that at every age, younger cohorts are consistently more mobile than older ones. For example, at age 27, a quarter (25 per cent) of those born in 1992 lived in another TTWA, compared with a fifth (21 per cent) of those born in 1986. This is in stark contrast to the US, where internal migration rates have been in sustained decline (Cooke, 2011; Molloy, Smith and Wozniak, 2011, 2017; Jia et al., 2023), and also diverges from the UK evidence to date which

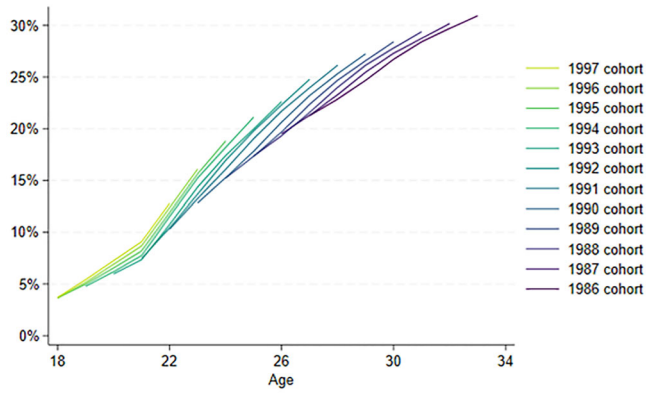

FIGURE 15 Migration rates by age and cohort. *Note*: This figure shows the share of people living outside their area of origin (age 16) at different ages, by birth cohort. 1986 birth cohort refers to the 2002 GCSE cohort, most of whom were born between September 1985 and August 1986. The lines in the legend are listed in the same order as shown in the figure. [Colour figure can be viewed at wileyonlinelibrary.com]

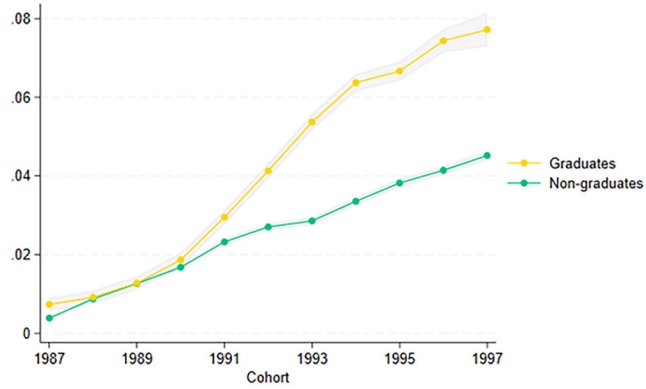

FIGURE 16 Migration rates relative to 1986 birth cohort. *Note*: Migration is defined as living outside ones area of origin (place of residence at age 16). The figure shows estimated cohort effects from a linear probability model controlling for demographic characteristics. [Colour figure can be viewed at wileyonlinelibrary.com]

shows virtually no change in long-distance migration rates for those aged 25–39 between 1971 and 2011 (Champion and Shuttleworth, 2017).

Differences in mobility by cohort could reflect differences in the composition of cohorts. For example, higher education participation has increased over time, and graduates are more mobile. To account for this and other observable differences across cohorts, I regress an indicator for having left one's area of origin on cohort dummies and a rich set of demographic controls, including area of origin, single year of age, gender, ethnic group, free school meals (FSM) and special educational needs (SEN) status at age 16 and whether English is an additional language (EAL). Regression for graduates also controls for university-and-subject groups. I run the regression separately for graduates and non-graduates. In the regression for graduates, I also control for university-and-subject groups.

The coefficients on cohort effects are plotted in Figure 16, which shows migration rates relative to the 1986 cohort. Even controlling for individual characteristics, the trend is clear: young workers – especially graduates – have become more mobile between 2012 and 2019. Graduates born in 1997 are 7.7 percentage points more likely to live outside their area of origin than those born in the 1986 cohort. For non-graduates, the difference is 4.5 percentage points. Trends for graduates and non-graduates diverge in 1990, roughly corresponding the cohort of graduates who entered the labour market after the financial crisis. Furthermore, up until recently the increase in mobility has been steeper among young workers from low-paying commuting zones, as shown in Figure 17, which plots coefficients on cohort effects interacted with a dummy for being from a commuting zone in the lowest three quintiles of local wage premiums.

More recent cohorts are also more likely to move to higher-paying commuting zones, conditional on observed characteristics – unsurprisingly, as mobility has increased more for workers from low-paying places. Panel (a) of Figure A.9 in the online Appendix shows that relative to the 1986 cohort, graduates born in 1997 are 3.7 percentage points more likely to move to a commuting zone with a higher estimated local wage premium than their area of origin, whilst non-graduates are 1.2 percentage points more likely to do so.[19] However, there has not been a big change in the probability of moving to London, as shown in panel (b) of Figure A.9. Graduates born in 1997 were 0.6 percentage points more likely to move to London than those born in 1986; for non-graduates, there has been no change in migration to London conditional on observable characteristics.

[19] I assume that firm, and hence commuting zone, premiums are fixed over time. This is consistent with the literature: Overman and Xu (2024) show that commuting zone (TTWA) premiums estimated on 1998–2007 data are very similar to those estimated on 2012–19 data ($R^2 = 0.86$), and Lachowska et al. (2023) and Engbom, Moser and Sauermann (2023) find that firm effects estimated over rolling time windows are remarkably stable.

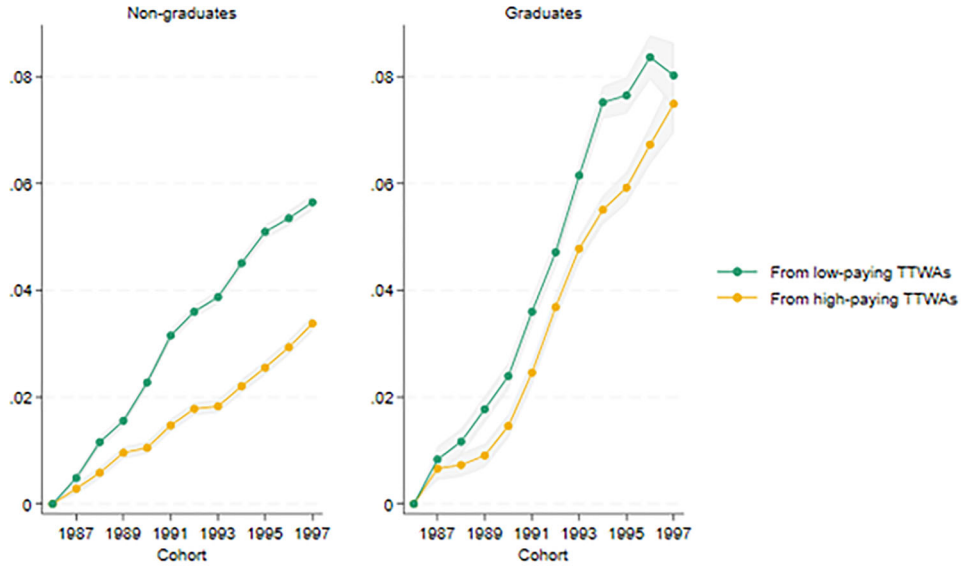

FIGURE 17 Migration rates relative to 1986 birth cohort, by local wage premium of area of origin. *Note*: Migration is defined as living outside one's area of origin (place of residence at age 16). The figure shows estimated cohort effects from a linear probability model controlling for demographic characteristics. Cohort effects are interacted with a dummy for being from a commuting zone in the lowest three quintiles of local earnings premiums. [Colour figure can be viewed at wileyonlinelibrary.com]

6 | CONCLUSION

Geographical inequalities in wages are large and persistent. Studies in the UK and elsewhere have shown that much of the variation in average wages across places can be explained by worker sorting. This paper shows that, in the UK, a large part of this sorting reflects selective migration in adulthood, rather than differences in educational attainment for people who grow up in different places. The correlation between local wage premiums and average educational attainment, measured by place of residence at age 32 (after migration), is 81 per cent higher than the correlation measured by place of origin (before migration).

London is the main beneficiary of early-career migration. Young workers can expect to earn 13 per cent more in London than in the average commuting zone. By age 27, over a quarter (28 per cent) of graduate movers from outside London move to the capital. Large outflows from London offset inflows in people's late 20s and early 30s, but high-skilled people continue to arrive and return migration is negatively selected. Despite the focus on reducing geographical disparities ('levelling up') in the UK in recent years, mobility increased between 2012 and 2019, and younger cohorts are more likely to move to places with better economic prospects. This suggests that migration could be playing an increasing role in widening geographical inequalities.

The importance of mobility means that policies to raise educational attainment in deprived places are unlikely to boost local economic performance on their own. Without coordinated policies to improve local opportunities – good jobs that are well matched to workers' skills, and productive firms providing those good jobs and training and development pathways – high-skilled people will continue to leave for places offering better prospects. Those who are not able or willing to move will not be able to make full use of their skills.

It also means that there is a zero-sum dimension to regional policy. Policies that boost London's economic performance or improve access to London (for example, by lowering housing costs or expanding transport links) will further increase the concentration of talent in the capital. All else equal, this reduces the ability of cities such as Manchester to retain and attract high-skilled workers, limiting their economic potential. The point is not that policies must disadvantage London, but that policymakers need to acknowledge the trade-offs involved – uncoordinated place-blind interventions can unintentionally widen gaps by amplifying selective migration.

Selective migration contributes to inequality between places, but it does not necessarily increase inequality between people. By enabling young people from disadvantaged regions to access better jobs, migration can provide a route to upward mobility and improve the matching of workers to firms, which raises aggregate output. Further, the composition of skills in an area will affect the local composition of firms and jobs, which means that migration patterns shape the opportunities available to locals. The challenge for policymakers is to design interventions that enhance opportunity and efficiency without deepening spatial divides.

ACKNOWLEDGEMENTS

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CONFLICT OF INTEREST STATEMENT

The author has no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from ONS (Department for Education; HM Revenue and Customs; Department for Work and Pensions; Higher Education Statistics Agency, 2025). Restrictions apply to the availability of these data, which were used under license for this study. Data are available from https://www.gov.uk/guidance/apply-to-access-the-longitudinal-education-outcomes-leo-dataset with the permission of ONS.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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