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The gainers and losers from the United Kingdom's university-related migration: A subregional analysis of Graduate Outcomes Survey data

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Abstract

Against the background of the rise in higher-education participation rates, this paper examines the spatial redistribution of undergraduates across the United Kingdom resulting from moves to and from university. Drawing on the Graduate Outcomes Surveys of 2017/2018 and 2018/2019, address data coded to 53 subregions (SRs) are used to track those enrolled on degree courses by age 20 from domicile to university and workplace 15 months after graduation. The paper begins by examining how university-ward migration serves to concentrate this group geographically and the way in which subsequent job-related moves tend to reinforce this process. Each person is then classified on the basis of their migration trajectories between domicile and workplace, enabling a set of migration accounts to be produced for each SR. Applying cluster analysis to these accounts, a six-way grouping of SRs is used to gauge change between their domicile and workplace populations in both overall numbers and qualitative characteristics, the latter being measured in terms of educational qualifications preuniversity and occupational status 15 months after graduation. These analyses demonstrate how the different types of SRs fare in these exchanges of students/graduates, with more subregions suffering the 'double whammy' of losing out in both quantitative and qualitative terms than gaining from this process, with challenging implications for central government's current 'levelling-up' agenda.

KEYWORDS

Graduate Outcomes Survey, levelling-up policy, subregional impacts, United Kingdom, university-related migration

1 | INTRODUCTION

The strong growth of tertiary education in recent decades (UNESCO, 2022) is a major new force in migration, both internationally and within countries (Abreu et al., 2014; Duke-Williams, 2009;

Mulley & Sachrajda, 2011; Smith & Jons, 2015; Smith & Sage, 2014; Zhan et al., 2020). Against the background of the classic age-profile models of migration propensity that are dominated by young adults moving for their first job (Rogers et al., 1978), the increasing number of school-leavers proceeding into higher education (HE) will have had

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two rather different effects. In cultures where most students attend university in their home area, it will delay moves associated with first full-time job by 3–4 years, though subsequently their extra knowledge and skills may widen their job-search range (Hooijen et al., 2020). Contrastingly, in the United Kingdom where the 'going away to university' tradition remains strong, increased HE participation—now exceeding 50% of young adults compared with barely 10% a generation ago (Department for Education, 2021)—inserts a new stage into the 'average' life course between leaving school and starting careers and provides a 'stepping-off' point that is different from their home area. Indeed, while migration theory suggests that those who have already made one move are then more migratory than those who have not made a first move (DaVanzo & Morrison, 1981; see also Ehrenfried et al., 2022), they may remain near their university rather than returning to their home area or moving to a third place for work or further study (Belfield & Morris, 1999; Sage et al., 2013).

Changes in migration arising from increasing HE enrolment will have impacts on place that are not just demographic but can also alter labour-force profiles in a way that will influence firms' investment decisions and be of interest to policymakers concerned with spatial variation in economic growth and personal well-being (Britton et al., 2021; Corcoran & Faggian, 2017; Economist, 2022). School-leavers staying in their area of domicile to obtain their degree will increase the pool of skills coming onto the labour market there, so securing a measure of 'levelling up' (see HM Government, 2022) for economically lagging areas (Abreu & Conway, 2021; Social Mobility Commission, 2020). Broadly the same outcome would result for lagging areas with a substantial HE presence if students attracted there choose to remain after graduation (Swinney & Williams, 2016; Willetts, 2021). More generally, the additional migrations resulting from the rise in HE participation in countries where 'going away to university' is the norm could be seen as raising national as well as individual welfare, because graduates moving for higher salaries and faster promotion would facilitate the matching of supply to demand, thereby boosting productivity (Faggian & McCann, 2008; Foresight, 2016; Kitagawa et al., 2022; Resolution Foundation, 2017).

Not surprisingly, therefore, HE-related migration has been attracting considerable attention in the United Kingdom from researchers and policymakers alike. As set out in the next section, this body of work has concerned itself primarily with the migration decisions of the students/graduates, the extent to which these vary according to their personal characteristics like gender, ethnicity and family background, and how far they have promoted or hampered the career trajectories of the mainly young adults involved. There is also a wealth of research on the implications for the places that they are moving from and to or staying in. One major strand which now goes under the label 'studentification' (see Smith et al., 2014, for a review) is not directly relevant for this study because it concentrates on the local impact of students within the receiving cities and towns after they have arrived there. By contrast, highly pertinent is the strand dealing with graduate retention and attraction, investigating whether those completing their courses stay or move elsewhere. Less attention,

however, has been paid to the overall changes in the geographical distribution of students between before and after their undergraduate courses, while additionally what work has been done on this theme has focused more on the broader regional impacts than on the subregional scale that aligns more closely with local labour markets.

The present paper adopts a subregional perspective and provides additional insights into the impact of the United Kingdom's HE-related migration by decomposing each area's overall change in student/graduate numbers in terms of the migration trajectories responsible. It builds on the pioneering work of Ball (2005) in disaggregating the new graduate workforce of each UK region by the routes by which any graduate ended up there; namely, 'loyals' working in the region where they had been living before and at university, 'returners' who had left the area for university but returned there to work, 'stayers' who moved into the region for university and stayed for work, and 'incomers' who were working there postgraduation but had not lived there previously. Here we follow the lead of Faggian et al. (2006) in subdividing this last group into those who moved to the region after attending university in their home region ('late leavers') and those who had changed region for university before moving again to their workplace region ('repeat movers'). But the full impact of HE-related migration on place needs to go beyond this five-fold breakdown of the region's graduate workforce and take account of those who left the region, this being by one of three possible trajectories depending on whether they left after attending university locally or left for university and either stayed in the university region for work or moved to a third region. On this basis, as developed in more detail below, the overall change in the number of students/graduates in a region between before and after university can be split into 8 components—the five migration types working in the region after completing their degree and the three types who had been living in the region before university but were working elsewhere postgraduation.

The next section of the paper situates our study within the wider context of the literature on HE-related migration. The following one provides more detail about the approach we have just described, as well as introducing our data source. We then present the results of applying this approach, identifying the principal dimensions of the numerical redistribution of students/graduates between before and after university and documenting how this impacts on the quality of human capital available in each subregion (SR). Then the discussion section demonstrates how the intelligence gained from applying the eightfold disaggregation feeds into debates about the steps that might be taken to help places retain more of their school leavers and/or university graduates and, as a result, potentially assist in reducing spatial inequalities in economic growth and social wellbeing.

2 | LITERATURE REVIEW

The volume of literature on HE-related migration has mushroomed in parallel with the rapid expansion of the HE sector over recent decades and comprises two main bodies of research that broadly

accord with stage in the migration process. One of these relates to the 'going away to university' (or not) decisions of those enrolling in undergraduate courses. Some of the earliest studies on university-bound migration were prompted by HE providers competing with each other to attract (the best) students (Hoare, 1991; Rees, 1986). Subsequent research has shown that this recruitment process creates clear pathways from domicile to university, labelled a 'student pipeline of migration' by Duke-Williams (2009) and a 'conveyor belt' by Smith and Sage (2014). Other studies similarly focussing on this initial stage of the UK's HE-related moves, including Bailey (2016), Carrascal-Incera et al. (2021), Champion (2022), Donnelly and Gamsu (2018), McClelland and Gandy (2012) and Whyte (2019), have examined the propensity of HE students to attend a nearby university as opposed to leaving their home area. The former has generally been found to be higher for those with certain characteristics such as being older, female, nonwhite, with lower school grades and from a less wealthy family background, as well as depending on proximity to an elite (or any) university. Overall, this strand confirms the way in which the HE enrolment process concentrates the undergraduate body in certain places at the expense of others, both numerically and in terms of academic ability.

The literature examining the migration behaviour of graduates following the completion of their studies is even more extensive, naturally being the dominant theme of research in countries where relatively few go away to university (see, for instance, Buenstorf et al., 2016; Krabel & Flöther, 2014; Reháč & Eriksson, 2020; Teichert et al., 2023; Venhorst & Cörvers, 2018) but with this being true for the United Kingdom too. Starting with Johnston (1989) and now including Abreu et al. (2014), Athey and Yu (2022), Bond et al. (2008), Comunian et al. (2017), Cunningham and Christie (2019), Faggian et al., (2006, 2007), Kollydas and Green (2022), Sage et al. (2013), Social Mobility Commission (2020) and Swinney and Williams (2016), much of this research concentrates on graduate retention and attraction. As with the work comparing university and home addresses, there is a considerable emphasis on the decisions made about whether or not to stay in the university region. As expected from migration theory, a postgraduation move is more likely for those who have already made an initial move by going away to university, but among these, a broad distinction is found between those returning to their home area as opposed to moving to a new area: returners average a lower class of degree while the onward movers are more likely to have attended a prestigious university (notably a member of the Russell Group) and head for a major city, notably London.

The outcomes from the migration decisions made by new graduates have generated a great deal of interest because of the way in which they can reinforce inherited regional differences in the distribution of human capital across the United Kingdom. A whole raft of analyses have demonstrated that the challenge of retaining and attracting graduates is greatest for universities situated in places suffering from the effects of de-industrialisation or in more remote locations with relatively small local labour markets (Bridge Group, 2021; Britton et al., 2021; Carrascal-Incera et al., 2022; Faggian & McCann, 2008; Foresight, 2016; Kitagawa et al., 2022;

Luminate, 2022; Resolution Foundation, 2017; Yu, 2022; also see Corcoran & Faggian, 2017, for a review). They reveal that, by contrast, the biggest gainers are the larger cities that have seen something of a 'renaissance' over the past couple of decades (Centre for Cities, 2023; Townsend & Champion, 2020) and especially the national capital which continues to act as a highly dynamic 'escalator region' to which well-qualified young adults are lured by the prospect of accelerated career progression (Fielding, 1992; Gordon et al., 2015). This interest is also reflected in the efforts made by the universities themselves to do more in support of their own regions as promoted by the Civic University movement (Goddard & Vallance, 2013; UPP Foundation, 2019).

A number of studies on the impact of postgraduation moves on the geography of labour supply have usefully analysed it in terms of the type of migration involved. For instance, according to Ball (2021), the vast majority of graduates working in Scotland after getting their degree were 'loyals', with 87% being Scottish domiciles and graduates of Scottish universities compared to just 22% of those working in London, where 25% were 'returners' who had left the capital to study elsewhere and 42% were 'incomers' who had not lived there before or during their university course. Similarly, focusing on the city level, Swinney and Williams (2016) found that nationally only 15% of those who go away to university remain in their university city for work, labelling the rest as 'bouncers' and noting that fully two-fifths of these were to be found working in London. Follow-up profiles of a selection of individual cities with universities provide a breakdown of their new graduate workforce; for example for Coventry with 39% moving there after graduation, 26% moving to study there and then staying, 19% domiciles who returned for work, and 16% who stayed for university and work (Centre for Cities, 2017). These reports also showed the origins of the cities' students and where these students were working postgraduation, including a summary of the resultant numbers of students/graduates gained and lost by each of those cities—but not the net effect on other places.

It is this strand of work that prompts the present study and that we aim to complement in three ways. In the first place, while following the Centre for Cities' lead in drilling down below the broad regional level with its profiling of cities with universities, we achieve full national coverage by adopting a geography where each of our SRs has at least some HE presence. Second, we shift the focus from the end of the process at the postgraduation workplace to the preuniversity stage, relating the moves to and from university to the original numbers living in each SR. Third and most importantly, ours is—as far as we are aware—the first study to put the sources of each area's gains and losses into an accounting framework that then reveals the relative importance of each migration component. These data provide the basis for classifying our areas in terms of the scale and composition of their overall change in numbers to identify regularities across the United Kingdom, with the resultant categories being explored further by reference to the quality of the human capital involved. This allows us to answer the question of whether and, if so, to what extent HE-related migration in the United Kingdom results in the greater concentration of talent into a small number of

favoured areas. The next section gives more detail about our approach to achieving these objectives.

3 | APPROACH

As just mentioned, the most novel aspect of our study is the deployment of an accounting framework that takes an area's change in its number of student/graduates between before and after their undergraduate course and decomposes it into the migration types responsible. We therefore start by setting out this framework, then describe our data set and subregional geography and outline the three-step approach of our analysis.

3.1 | Accounting framework

As mentioned in the introduction, we draw on the work of Ball (2005) and Faggian et al. (2006) to identify the eight migration components responsible for the change in number of students/graduates for each SR. Table 1 presents our accounting framework as it relates to subregion A. Those living in A before university can be separated into five types. A keeps two of these in the sense that these same people can be found working there postgraduation either because they attended university there and so never moved away during this period ('nonmigrants') or because they returned there for work after moving away to study ('returners'). The other three types, however,

are lost by subregion A, either because they leave after attending a local university ('late leaver') or they go away to university and either stay in its SR for work ('university retainee') or move on to a different subregion for work ('repeat mover'). Potentially counterbalancing these losses are the three types of migrant which hail from elsewhere but are working in subregion A postgraduation, either coming from their own domicile on the completion of their undergraduate course or moving to A for university and staying or moving from a university that is not in their home area (respectively, 'late leavers', 'university retainees' and 'repeat movers' from the rest of the United Kingdom). In our analysis, we express the number of each of these eight migrant trajectories as a percentage of the SR's starting population of school-leavers who go on to become graduates. This gives each SR a profile that will be unique but which may bear a degree of resemblance to some of the others' profiles—similarities that we seek to assess the significance of.

3.2 | Data

As regards populating these accounts, we use a data set provided by the United Kingdom's Higher Education Statistics Agency (HESA) based on its annual Graduate Outcomes Survey (GOS) (HESA, 2023). This collects detailed data about UK graduates, including among others their employment status, workplace location, and occupation approximately 15 months after graduation. In addition to these variables, our data set is enriched with supplementary variables from

TABLE 1 A framework for decomposing the change in a subregion's (SR) number of students/graduates between before and after university, by migration trajectory.

Components of SR's change in number	Domicile SR	University SR	Workplace SR	Description and effect on A
Kept by SR				
SR nonmigrants	A	A	A	Stayed in A for university and job, so no change for A
SR returners	A	B	A	Returned to A for job after university elsewhere, so no net change for A
Lost by SR to RUK				
SR late leaver	A	A	B	Left A after graduation for job, so a loss for A
SR university retainee	A	B	B	Left A for university in B and stayed there for job, so a loss for A
SR repeat mover	A	B	C	Left A for university in B and then moved to C for job, so a loss for A
Gained by SR from RUK				
RUK late leavers	B	B	A	Moved from B to A after university, so a gain for A
RUK university retainee	B	A	A	Moved from B to A for university and stayed there for job, so a gain for A
RUK repeat mover	B	C	A	Moved from B to C for university and then moved to A for job, so a gain for A

Note: SR Subregion A; RUK Rest of the United Kingdom. A is the SR for which the overall change in student/graduate numbers is to be decomposed, while B and C denote different SRs. Those kept or lost by the SR originated in A (their domicile), while those gained by the SR originated from the RUK and were working in A 15 months after graduation, having arrived in A via one of three alternative migration trajectories.

HESA's student records, encompassing location before higher education ('domicile'), university attended, study mode, qualification earned, socio-demographic background and previous educational attainment. These data provide a comprehensive view of the graduates' profiles, reflecting both their academic journeys and their subsequent geographical and professional trajectories. Focusing on those who went to university directly upon leaving school or after a gap year, our sample comprises those who began their undergraduate courses up to age 20. Additionally, we restrict it to those for whom there was adequate geo-referencing of their UK domicile, their place of study, and their workplace 15 months after graduation, necessarily excluding international student arrivals and UK domiciles who went abroad to study. To ensure sufficient sample size for the more disaggregated stages of the analysis, we combined the data for two graduate cohorts: those completing in 2018/2019 (the latest available at the time of our analysis) and in the previous academic year 2017/2018, yielding a total of 214,645 cases.

Importantly, GOS is regarded as a high-quality data set. Firstly, it does not appear to have been affected much by the COVID-19 pandemic. Despite the more recent (2018–2019) cohort of graduates being surveyed in autumn 2020, the number of responses was as high as for the previous (unaffected) year and their distribution by workplace also very similar to that of the 2017/2018 cohort. Second, while HESA recognises that there may be nonresponse bias, its checks established that weighting to allow for this made no significant difference to its estimates, with its 50% response rate no doubt being an important factor here. The high degree of confidence placed in GOS—and its predecessor survey on the Destination of Leavers from Higher Education (DLHE)—is also reflected in the large number of studies that have used it for tracking migration between domicile and workplace as well as relating workplace achievement back to type of degree and personal background. A nonexhaustive list of these studies includes Athey and Yu (2022), Abreu and Conway (2021), Belfield and Morris (1999), Bridge Group (2021), Donnelly and Gamsu (2018), Faggian et al. (2006, 2007), Foresight (2016), Kitagawa et al. (2022), Luminare (2022), Swinney and Williams (2016) and Yu (2022). Additionally, Comunian and Corcoran (2022) have used this data set alongside its Australian equivalent to compare moves between university and workplace within the two countries. The fact that GOS gives workplace rather than residence as the address 15 months after graduation is not a problem for our study, because as is the case for those just cited the emphasis is on workplace availability.

3.3 | Subregional geography

Our approach was constrained by two considerations: the detail provided by GOS and our study's emphasis on local labour market impact. Our data set gives least detail for workplace, this being coded in our data set to a relatively new framework that is not consistent across space. Greater London and the six former metropolitan counties of England are each treated as single areas, while the rest of

England is split between all the separate unitary authority areas and the shire-county remainders. Along with the unitary level used for the United Kingdom's other three countries, these comprise 155 areas that vary in population size from London with over 8 million to Rutland with just 40,000, so to achieve greater consistency with the treatment of the former and also ensure at least a minimum number of undergraduate places in each SR, England's unitary authority areas are combined with their geographical counties, while those in Wales and Scotland are grouped into broader zones and Northern Ireland is treated as a single area. The resultant division of the United Kingdom into 53 SRs gives much more spatial detail than the 12-way breakdown traditionally used for regional analysis. The full list of SRs can be found in Supporting Information: Table S1, along with details of their constituent areas.

3.4 | Analysis

We approached the analysis in three stages. First, for the 53 SRs individually we examined their net gains and losses resulting from the migration of students/graduates between domicile and university, then between university and workplace 15 months after graduation, and lastly the overall displacement effects comparing domicile and workplace numbers. For this purpose, we adopted the metric used by Champion's (2022) analysis of the net impact of university-bound moves, namely representing each SR's count after the relevant move as a ratio of the premove count, with a ratio above 1.00 indicating a net gain from the process and a ratio below 1.00 meaning a net loss.

In the second stage, we investigate the dynamics of each SR's experience of student/graduate migration by decomposing its overall change in number of students/graduates between before and after university by type of migrant. This is where we apply the accounting framework outlined in Table 1 above. Cluster analysis is then used to classify the 53 SRs in terms of the relative importance of these eight migration components, providing a clearer understanding of communalities and differences in student/graduate migration, effectively grouping together the SRs that exhibit comparable migration dynamics in terms of both inflow and outflow.

The third stage of our study shifts attention from the pure numbers involved (i.e., the quantities) to the impact in terms of the spatial redistribution of the human capital caused by this migration. This analysis draws on the GOS data set's wealth of information about the characteristics of our sample, relating not just to their work 15 months after graduation but also to their preuniversity background. For present purposes, we focus on two such 'quality' measures, namely educational achievement preuniversity and their job status postgraduation.

This final part of the analysis allows us to discover how far the qualitative dimension of this HE-related migration serves to reinforce or to mitigate the purely numerical impacts. Our starting hypothesis is that those SRs which register the largest relative drop in numbers as a result of this migration are also those which experience the greatest reduction in the average quality of their student/graduate

populations between before and after university. If such a 'double whammy' is the dominant feature, is this paralleled at the other end of the scale by places that gain both quantitatively and qualitatively, suggesting a process of cumulative advantage that poses a substantial policy challenge for any 'levelling up' agenda? This hypothesis is tested by reference to the classification of SRs derived at the previous stage.

4 | FINDINGS

4.1 | The numerical gainers and losers from student/graduate migration

Our first set of results relates to the numbers gained or lost by each of the 53 SRs due to moves between domicile, university and workplace 15 months after graduation. The patterning of these changes across the United Kingdom is displayed in the three maps of Figure 1. As detailed in the previous section, the values represent the ratio of the number at the later time to that at the earlier time, with the full set of ratios available for inspection in Supporting Information: Table S2.

Map A deals with the 'going away to university' stage of the process, with the number at university in each SR expressed as a ratio of the SR's domicile number. For instance, Nottinghamshire comes top with a ratio of 2.82, signifying that the number in our sample who had been registered at universities there (8820) was nearly three times the number giving this SR as their preuniversity address (3125). Also with a ratio above 1.50 are another nine SRs (shown in red), all clearly with a substantial university presence. At the other end of the scale is Suffolk, with a ratio of 0.14 based on 340 of our sample studying there compared with its 2365 domiciles. Highlands and Islands is close to this, at 0.15, with another 10 SRs (shown in the dark blue) losing at least half of their domiciled number in net terms. These are a mirror image of the former group in having a very sparse HE presence, while the other two classes of SR, with ratios between 0.50 and 1.50, contain a more even balance of university places and student demand, including Greater London which generates more undergraduates than it has places for, especially after allowing for its great attractiveness to international students who, as previously mentioned, cannot feature in this analysis.

Second, Map B compares the number working in each SR 15 months after graduation with the number that had been attending university there. The expectation from the literature (Britton et al., 2021; Glaeser & Resseger, 2010; Swinney & Williams, 2016) is that London will be a major beneficiary because of being the premier attractor of highly qualified people looking for work, but it is also likely that the SRs that registered the largest net losses from the 'going away to university' process will see something of a rebound because of graduates returning to their domiciles. Both these expectations are realised. Greater London's ratio is 2.39, meaning that its number of graduate workers in our data set is more than double the number who had studied there. Most of the others with

ratios of 1.50 or more are those originally experiencing the greatest draining away to university, as just seen in Map A. At the other end of the spectrum are SRs with a large HE presence but fewer job opportunities, either because of containing smaller cities and towns and/or being characterised by relatively weak economies. County Durham has the lowest ratio, at 0.34 meaning that its number of working graduates was only one-third of its undergraduate number, with the next lowest being Nottinghamshire, Leicestershire, Devon, Mid Wales and Dundee, these all losing more than 50% of their universities' graduates in net terms.

Finally, Map C shows that, while a generally negative relationship is found between these two stages of moving to and from university, the high ratios in Map B for some of the SRs that lost most from 'going away to university' migration does not necessarily mean that they managed to recoup the whole of that initial loss. Highlands & Islands and Suffolk are just two of the cases that illustrate this point: when their numbers by workplace are compared with their preuniversity numbers, the ratios are 0.52 and 0.61, meaning that across the whole process they have experienced a net loss of 48% and 39% of their original numbers respectively. At the other end of the scale, it is no surprise to find Greater London in pole position, with a ratio of 1.72, followed by Bristol, the second most economically dynamic of the UK's larger cities. Only 15 other SRs made net gains, many of these comprising large cities and/or national capitals that are obvious draws for young talent (Birmingham, Cardiff, Edinburgh, Glasgow, Leeds, Liverpool, Manchester, Newcastle upon Tyne, Nottingham and Sheffield), along with places noted for their R&D capacity including Oxford and Cambridge as well as Berkshire on the M4 corridor, Dundee noted for its video games industry and Aberdeen associated with North Sea oil. Map C's revelation that fully two-thirds of the 53 SRs posted a net loss is testament to the overall concentrating effect of HE-related migration.

4.2 | The components of the changes in overall numbers

We now decompose the net change in each SR's numbers between before and after university (as mapped in Figure 1c) on the basis of the components set out above in Table 1. Table 2 demonstrates how we derive a 'migration account' for an SR. The 8 components are grouped into three broader types. At the top are the two components 'kept' by their original SR, i.e. with their workplace being in the same SR as where they hailed from. This was either because they were 'nonmigrants' or because they returned there after moving away to university as 'returners'. Nationally, as shown in brackets in the first column, the latter make up just under one-third (31.3%) of our sample, while nonmigrants accounted for just over one-fifth (21.6%). The middle panel in Table 2 shows how the 47% that the SRs lost in the process of going to and from university were split between the other three migrant types of the SR's domiciles: those who studied there and then moved elsewhere ('late leavers', 5.0% nationally), those who left for university and then stayed on in their new SR

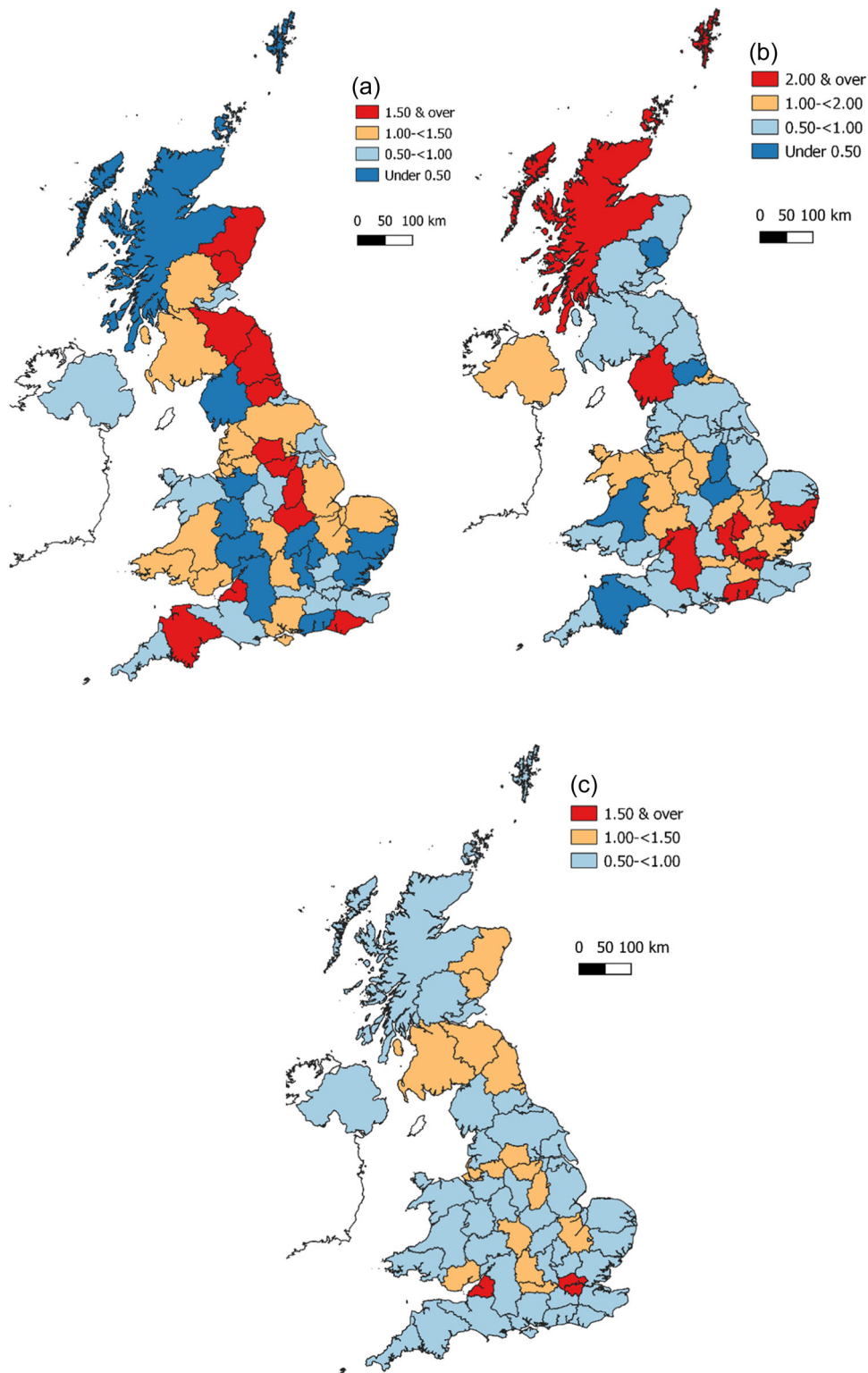


FIGURE 1 Net change in student/graduate numbers for 53 subregions: (a) University number as ratio of Domicile number. (b) Workplace number as ratio of University number. (c) Workplace number as ratio of Domicile number.

(‘university retainees’, 14.3%), and those who left for university and then moved again to a third SR for work (‘repeat movers’, 27.7%). The bottom panel contains the same three types, but here the SR is gaining them from the rest of the United Kingdom (hence the prefix RUK instead of SR).

The other four columns of Table 2 demonstrate how we populate this accounting system with the numbers for each SR, using the two identified in the previous section as the extreme cases in terms of the percentage change in their numbers between before and after university. For Greater London, the number working there 15 months

TABLE 2 Change in number of students/graduates between domicile and workplace, by component of change, for the Greater London and Highlands and Islands subregions (SR): number and % of domicile number.

Component of change (% of national sample)	Greater London		Highlands and Islands	
Domicile number	31,820	100.0	1405	100.0
Kept by SR				
SR Nonmigrant (21.6)	10,455	32.9	125	8.9
SR returner (31.3)	15,235	47.9	370	26.3
Total kept (52.9)	25,690	80.8	495	35.2
Lost from SR to RUK				
SR late leaver (5.0)	1445	4.5	45	3.2
SR university retaineer (14.3)	1580	5.0	470	33.5
SR repeat mover (27.7)	3105	9.8	395	28.1
Total lost (47.0)	6130	19.3	910	64.8
Gained by SR from RUK				
RUK late leaver (5.0)	1950	6.1	75	5.3
RUK university retaineer (14.3)	5895	18.5	15	1.1
RUK repeat mover (27.7)	21,280	66.9	140	10.0
Total gained (47.0)	29,125	91.5	230	16.4
Workplace number	54,815	172.3	725	51.6
Change from domicile number	+22,995	+72.3	-680	-48.4

Note: Numbers may not sum exactly because of rounding to nearest 5. RUK Rest of the United Kingdom. The third and fifth columns express the number as a percentage of the domicile number.

Source: Authors' calculations from GOS data for 2017/2018 and 2018/2019 cohorts combined.

after graduation, at 54,815, was 22,995 or 72.3% more than the 31,820 originally domiciled there, this being due to retaining 80.8% of its original domiciles (as nonmigrants or returners) and attracting 29,125 newcomers, the latter being predominantly those who had already made one move between a non-London home and a non-London university (as repeat movers). By contrast, for Highlands and Islands, the workplace number was 48% down on the domicile number, with almost two-thirds of the latter (64.8%) leaving for good (by 15 months after graduation at least) and with these being only very partially offset by the number of newcomers, the latter equating with only one-sixth (16.4%) of its original domicile number.

The results of applying this form of accounting to all 53 SRs are presented in Supplementary Matter Table 3. Here, we summarise the main patterns across the United Kingdom by classifying the 53 SRs on the basis of their 'score' on the eight components, that is, the two 'kept' migrant types, the three 'lost' ones and the three 'gained' ones. For this purpose, we used k-means cluster analysis and selected the

six-cluster solution as being the most readily interpretable, with the result mapped in Figure 2. In Table 3 the clusters are arranged by rate of change in total number of students/graduates between domicile and workplace SRs (see bottom row). Greater London comes in pole position as the sole member of Cluster 1, with its overall growth of 72% and with the eight components' contributions to this overall change as already seen in Table 2. Cluster 2 comprises two members—Bristol and Nottinghamshire—with an overall growth of 39%. Compared to London, this pair lost 2.5 times as many original residents due to their larger shares moving away to university and either staying in their university SR or moving on again. They kept less than half the proportion of nonmigrants that London managed to hold on to and also attracted back fewer residents who had gone elsewhere to study. The newcomers whom they gained boosted their workplace numbers almost as much as for London, but with a different complexion, retaining far more of those who had moved there for university and attracting relatively fewer repeat movers.

Cluster 3 members, in aggregate, posted an uplift in numbers by 12%. As shown in Figure 2, its membership is dominated by England's main secondary cities (i.e., all the former 'metropolitan counties'), plus the national capitals of Wales and Scotland and the Dundee and Aberdeen SRs. This type held on to its original residents better than Cluster 2, particularly on account of its strong share of nonmigrants which was on a par with London's. But it was much weaker in terms of attracting newcomers, with fewer staying on after moving there

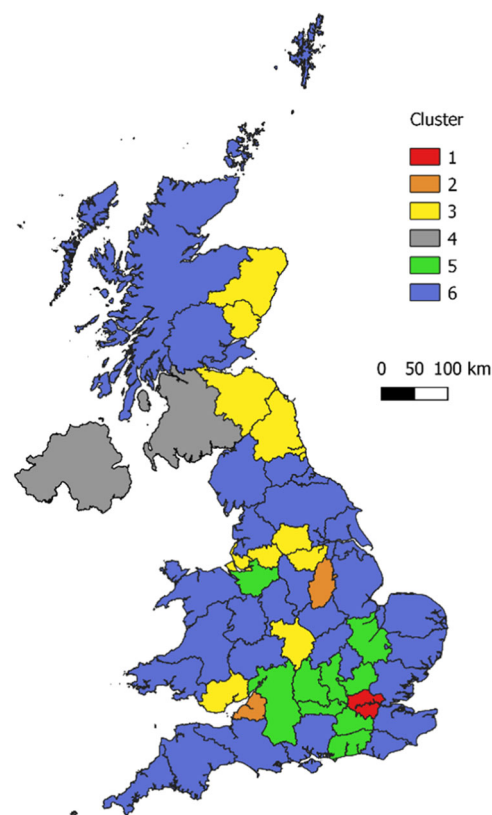


FIGURE 2 The six-cluster classification of the 53 subregions.

TABLE 3 Change in number of students/graduates, by component of change, for a six-cluster classification of the 53 SRs, % of the domicile number.

Component of change (% of national sample)	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6
Domicile number	100.0	100.0	100.0	100.0	100.0	100.0
Kept by SR						
SR Nonmigrant (21.6)	32.9	15.2	32.4	61.7	3.8	11.6
SR returner (31.3)	47.9	35.9	29.2	13.7	32.0	28.5
Total kept (52.9)	80.8	51.1	61.6	75.4	35.8	40.1
Lost from SR to RUK						
SR late leaver (5.0)	4.5	4.8	7.7	8.4	2.0	4.3
SR university retainer (14.3)	5.0	15.6	11.8	7.5	17.0	19.6
SR repeat mover (27.7)	9.8	28.5	18.9	8.7	45.3	36.0
Total lost (47.0)	19.3	48.9	38.4	24.6	64.3	59.9
Gained by SR from RUK						
RUK late leaver (5.0)	6.1	6.9	5.2	1.8	6.5	4.2
RUK university retainer (14.3)	18.5	41.4	24.2	6.4	6.6	9.1
RUK repeat mover (27.7)	66.9	39.2	21.1	5.5	34.0	16.3
Total gained (47.0)	91.5	87.5	50.5	13.7	47.0	29.7
Workplace number	172.3	138.6	112.1	89.1	82.8	69.8
Change from domicile number	+72.3	+38.6	+12.1	-10.9	-17.2	-30.2

Source: As for Table 2.

for university than for Cluster 2 and far fewer repeat movers than both there and London.

The remaining three clusters all posted losses. The biggest hit is seen for Cluster 6, with its overall number down by 30% by 15 months after graduation. It retained only two in five of its original residents and this was much more due to those returning after going away to university than to staying for both university and work. Compared with the three 'growth' clusters, this type was weak on all three types of in-migrant worker, with many fewer staying on after moving there for university ('RUK university retainers') and also far fewer ending up there after two moves ('RUK repeat movers'). This SR cluster is by far the most common of the six types and, as shown in Figure 2, basically comprises many of the more peripheral and rural areas that have relatively low densities of population, undergraduate places and job opportunities, including the Scottish Highlands & Islands SR previously profiled in Table 2.

Cluster 5 has the next highest rate of overall loss, at 17%, with a membership that is probably best characterised as 'wealthy suburban', dominated by SRs around London (except on its less wealthy eastern flank) and including Oxford and Cambridge as well as Cheshire abutting on to Greater Manchester. These SRs, in aggregate, took an even bigger hit than the rural and peripheral SRs of Cluster 6 in terms of keeping only about one-third of their original domiciles and this almost entirely due to those returning there after university

elsewhere. Meanwhile, they score strongly on those who have arrived there after living in two other SRs previously ('RUK repeat movers')—presumably reflecting stronger job opportunities than Cluster 6 and tending to emulate the conurbations and larger cities of Cluster 3 as well as London.

Finally, with its overall number 15 months after graduation being 11% below the domicile number, Cluster 4 comprises just two members, Glasgow (covering South West Scotland) and Northern Ireland. These share London's ability to have a large proportion of its original residents working there, but in this case being due to the huge proportion staying for university as opposed to returning after studying elsewhere. This pair scores very low on attracting newcomers of any migration trajectory.

In sum, the classification of the 53 SRs into six clusters on the basis of the contribution of 8 components of migratory change yields a clear patterning across the United Kingdom in terms of the overall change in numbers between before and after university, ranging from the high net increase registered by London to the substantial net loss averaged by the cluster of more rural and remote SRs. The decomposition of the overall change rates into their separate components in Table 3 provides extra insight into the dynamics behind these impacts, allowing the identification of the types of SRs that score more strongly or weakly in terms of the retention and attraction of students and graduates.

4.3 | Impact of student/graduate migration on the quality of human capital

In this third and final stage of our study, we assess the impact of this migration on the human capital available at the subregional level, again comparing the situation before and after university and using the same six-cluster classification as above. As mentioned previously, two measures are used for this purpose, one relating to educational qualifications attained before university enrolment and the other based on job status 15 months after graduation. For the former, the selected metric is average tariff score (ATS), which summarises the qualifications earned after the age of 16, such as A levels, level 3 diplomas/certificates and baccalaureates. For quality of job, the chosen metric is occupation, where we separate out those engaged in managerial, professional and associate professional work (Standard Occupational Classification's major groups 1, 2 and 3) from lower-

TABLE 4 Change in the number of student/graduates and their average tariff scores (ATS) between pre- and post-university location, grouped by SR cluster.

Cluster	At domicile		At workplace		% change	
	Number	ATS	Number	ATS	Number	ATS
1	30,195	359	51,920	382	71.9	6.4
2	6225	363	8675	370	39.4	1.8
3	40,660	364	45,025	363	10.7	-0.4
4	6960	353	5735	350	-17.6	-0.8
5	33,210	376	27,295	367	-17.8	-2.2
6	71,655	371	50,250	358	-29.9	-3.4
All	188,905	368	188,905	368	0.0	0.0

Note: Number rounded to the nearest 5 and ATS rounded to nearest whole number, so % change may not correspond exactly. Scotland's SRs are omitted (see text).

Source: As for Table 2.

TABLE 5 Change in the number of students/graduates and their occupational composition between pre- and post-university location, grouped by SR cluster.

Cluster	Overall change (%)	Change in SOC 1-3 (%)	Change in SOC 4-9 (%)	% SOC 1-3 at t1 location	% Soc 1-3 at t3 location	% point change in SOC 1-3 t1 > t3
1	72.3	91.7	28.2	69.5	77.3	7.8
2	38.6	40.6	34.4	68.8	69.8	1.0
3	12.2	12.5	11.6	67.0	67.2	0.2
4	-10.9	-14.6	-1.9	71.1	68.2	-2.9
5	-17.2	-19.6	-10.7	73.6	71.5	-2.1
6	-30.1	-35.8	-17.4	69.3	63.7	-5.6
All 6	0.0	0.0	0.0	69.6	69.6	0.0

Source: As for Table 2. N = 214,200.

status jobs. In both cases, the workplace-based numbers are compared with those recorded before university-ward migration occurred, so as to measure the difference between the actual outcome and the situation that would have prevailed if there had been no migration or if those who had left for university had all returned to their domicile SR.

Table 4 displays the results for preuniversity educational attainment, omitting Scotland's domiciles because of that country's very different schooling system, notably impacting on Cluster 4, which now comprises just Northern Ireland. Otherwise, the pattern of numerical change across the six clusters (see penultimate column) is very similar to that shown in Table 3. The impressive feature that is added by this analysis is that the change in ATS (final column of Table 4) follows the same pattern: Cluster 1's Greater London heads the ranking, with its workplace-based ATS of 382 being 23 points and 6.4% above the level of 359 averaged by its domiciles before migration to and from university took place. At the other end of the scale, the more rural and peripheral SRs of Cluster 6 saw a 3.4% drop in ATS from 371 to 358, and there is a regular progression across the intermediate clusters. Here is very clear evidence of a 'double whammy' effect of HE-related migration, with the places that gained most in numbers also gaining most in terms of quality of human capital. As a result, the qualitative patterning has been substantially reversed from the preuniversity situation where the two highest ATS were registered by Clusters 5 and 6 to the postgraduation one when it is Clusters 1 and 2 that top the ranking.

The metric relating to job status covers the whole UK including Scotland and largely parallels these findings, with the main focus being on higher-status work represented by SOC Major Groups 1-3 compared to the rest, as shown in Table 5. Greater London (Cluster 1) registers by far the strongest increase in the higher-status number and the biggest upward shift in the proportion of high-status graduates, up by 7.8% between the actual situation postgraduation and what it would have been if there had been no HE-related migration or if all those moving to study had returned to their domicile SR. The 'double whammy' is again evident because, at the

other end of the scale, Cluster 6 with its 29 largely rural and peripheral SRs registers a 36% contraction in its aggregate high-status number compared with what it would have been if all its domiciles had been back at home 15 months after graduation (second data column) and with these now making up 5.6% fewer of its total graduates (final column). For the four clusters lying between these extremes, the growth rate for higher-status jobs falls progressively down the list, while the ranking for the change in their share is nearly as regular, with just Cluster 4 (Glasgow and Northern Ireland SRs) being out of order.

We thus find that the impact of between-SR movement on the quality of the student/graduate body largely works to reinforce the quantitative effect. The biggest beneficiary of this HE-related migration is Greater London, which not only records the strongest net gain of numbers but also registers the biggest swing in favour of higher-quality graduates. The exact opposite is seen for the more rural and peripheral SRs of Cluster 6, losing heavily in terms of both numbers and quality, while there is a fairly regular progression across the four clusters in between. Clearly, the whole process of movement to and from university is one that leads towards greater geographic concentration in both quantitative and qualitative terms.

5 | DISCUSSION

With growing demand for higher-level skills in many advanced economies (Industrial Strategy Council, 2019; Wilson et al., 2022), there is a clear trend towards young people staying in education for longer, with over half of young people in the United Kingdom now attending university, as outlined in the introduction. With mass participation in higher education, transitions into employment are occurring later than was the case for previous generations (Kirchner Sala et al., 2015). 'Going to university' has become a key life-stage event across Western economies and the tradition in the United Kingdom has entailed a move 'away' from the parental home and the local area (Holdsworth, 2009; Whyte, 2019). This means that a substantial number of young adults now have experience of migration before entering the labour market. University-related moves—both to university and from university to employment—have the potential to play a more important role in patterns of population redistribution of young people than in the past when a greater share of nonlocal migration of school leavers was job-related. Young people's experience of 'going away to university' is likely to shape their future migratory behaviour. This is why the study of HE-related migration is important, and especially so at a time of long-term decline in internal migration rates in many developed economies (Cooke, 2013).

Our analysis has highlighted the scale and nature of population redistribution away from peripheral rural areas, particularly at the stage of initial moves to university. This is the classic 'educating out' of rural areas which is evident internationally, with movement away of the most academically qualified young people to take up opportunities for study and employment elsewhere (Smith &

Sage, 2014; Thissen et al., 2010). As noted by the Social Mobility Commission (2020), the rationale for such out-migration is that good universities are concentrated in urban areas and the quantity and variety of well-paid jobs is also greater in such areas. Hence, social mobility is associated with spatial mobility. While there is evidence of some return migration after university, the original loss—in both quantitative and qualitative terms—is not fully recouped. This not only fuels demographic ageing, with such areas tending to be characterised by relatively large older populations. Low demand for high-level skills fuels out-migration of the highly qualified, creating low-skill equilibrium traps where there is a circular relationship between comparatively low supply and low demand for skills (Green, 2016), so hampering local economic development and attempts to 'level up'. However, it is not only the peripheral rural areas that lose out; included in the two-thirds of our SR found to be losing population through HE-related moves are the 'wealthy suburban' areas adjacent to London, the M4 corridor, Cambridgeshire and Cheshire, but unlike the peripheral rural areas these are attractive to repeat movers. This helps fuel their economic dynamism, while their geographical accessibility to job opportunities means that they are also likely to be relatively attractive to dual-career households (Green, 1997) as the young people analysed here move on to subsequent life stages.

At the opposite end of the spectrum from the peripheral rural areas is London, which sees gains in numbers and quality and underscores how patterns of mobility serve to exacerbate regional inequality in skills (Britton et al., 2021), driving uneven development in the United Kingdom (Rowthorn, 2010). London's attractiveness for young people in their early careers is emphasised not just by the return of many of those who went away to university but even more so by its 'escalator region' pull (Champion & Gordon, 2021; Fielding, 1992) for repeat movers. The fact that most second-tier 'regional cities' are clustered together in our results indicates that they share some common features in terms of components of university-related migration. In aggregate, they are net gainers, but the components-of-change analysis suggests that there is scope for them to enhance their appeal for repeat movers, in particular. Although London remains a strong magnet for graduates starting their careers, an increasing trend for more large organisations to recruit a greater share of their graduate trainees in cities outside London might be helpful in this respect, with regional cities offering cheaper living costs (Zulfiqar et al., 2023). Many universities, including high-tariff entry ones which have tended to be at the forefront of a 'brain drain' to London (Swinney & Williams, 2016), are placing greater emphasis on graduate retention to help boost regional economies (Universities UK, 2017) and on providing graduates with enhanced professional opportunities through partnerships with regional employers. Nonmigrant graduates also appear to constitute a relatively large component of the new graduate workforce here. This highlights the importance of ensuring that HE providers and subregional stakeholders work together to ensure that new graduates are equipped to meet regional skills needs, including through strengthening links between employers and local universities via

placements, internships, and so forth. The same policy and practice recommendation applies to Northern Ireland and Glasgow which are particularly reliant on 'home-grown' graduates.

Subregional variations in the components of change in university-related migration evident from our analysis thus provide useful intelligence for policy makers on where, and on whom, to focus their efforts for retaining and attracting talent. Potential solutions include highlighting and expanding local opportunities both for study (in Further Education institutions as well as HE) and for employment combined with training. It also points to the need to operate proactively to provide a quality of work and life package sufficient to tempt highly qualified 'locals' who lived in the area preuniversity to move back and to draw in nonlocals. Better aligning university course and skills provision with the requirements of employers in specific places, as well as increasing interaction with local industries, would help retain and attract young graduates and lead to a more equitable distribution of human capital nationally. In a similar context, systematic policy interventions should target places lacking investment in science and technology infrastructure and possessing a greater proportion of small and medium-sized businesses that currently do not engage in university collaborations. Addressing at least some of the spatial imbalances identified in this study—for instance, by improving education system efficiency, fostering human capital accumulation, bolstering entrepreneurship and innovation and increasing the number of attractive jobs—could contribute to stimulating a virtuous circle of high supply and high demand for skills, thereby boosting productivity and prosperity in these areas.

6 | CONCLUSION

This paper has provided important insights into the nature and impact—both quantitative and qualitative—of HE-related internal migration at subregional level across the United Kingdom. 'Going away to university' and entry into the labour market after graduation have an overall impact that is substantially uneven geographically; twice as many of our 53 SRs lost young adults through this process than gained. Furthermore, we have provided evidence for a 'double whammy' effect, with some types of SRs losing out in quality of human capital as well as in numerical terms while others gained on both scores. This accentuates subregional demographic and economic differences through the operation of agglomeration economies, exacerbating the challenges of reducing spatial inequalities. This is why the subregional variation in the components of change in HE-related migration evident from our analysis is useful in providing intelligence for policy makers on where, and on whom, to focus their efforts for retaining and attracting young talent.

At the same time, our study does not provide the full picture. First, the GOS data set gives outcomes only at 15 months after graduation, preventing an extended longitudinal perspective on patterns of spatial mobility and career progression—one that would be particularly helpful for graduates who were unemployed or

undertaking further study at that point. This, however, requires alternative data sources like the Longitudinal Education Outcomes survey or bespoke surveys like the Futuretrack study (Elias et al., 2021), but such sources also have their limitations in terms of such key aspects as population coverage, sample size and detailed information on spatial mobility (Universities UK, 2022). Second, by definition, GOS does not track those who leave the United Kingdom to attend university, while our accounting approach cannot accommodate international students enrolling at a UK university because they do not feature in our SRs' school-leaving populations. Similarly, with its focus on the school-leaving age cohort, our study ignores those delaying their entry into HE until age 21 or later, though such 'mature students' are relatively few in the United Kingdom.

Finally, there is also scope for further research using our restricted data set. More detailed analysis of subregional patterns of moving (and staying) could be undertaken through disaggregation by individual characteristics such as gender, ethnic group and social class background, while multivariate regression techniques could examine drivers of leaving and staying, using a range of individual, institutional, economic and geographical variables. At subregional level, the GOS data allows analysis by university and subject of study, so enabling detailed insights into movers and stayers that are likely to be of interest to regional and local stakeholders concerned with economic development and addressing specific skills needs. More detailed comparative investigation is also possible on how the various universities within a particular SR contribute differentially to HE-related migration. Such analysis is likely to be of interest given the increasing emphasis on the civic roles played by universities referenced earlier, especially in large metropolitan areas with diverse populations and a range of universities which have traditionally had different global and regional outlooks. Moreover, this interest is unlikely to wane, as neither the COVID-19 pandemic nor other factors such as rising fees and accommodation costs seem to have dented people's desire to obtain a degree and keenness to move away to university for this, reinforcing Smith and Jons's (2015) exhortation for further research on spatial mobility at this pivotal stage of the life course.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from HESA. Restrictions apply to the availability of these data, which were used under license for this study. Data are available from the author(s) with the permission of HESA. **HESA Data caveat/attribution:** "Copyright Higher Education Statistics Agency Limited 2021. Neither the Higher Education Statistics Agency Limited nor HESA Services Limited can accept responsibility for any inferences or conclusions derived by third

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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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