

Regional brain drain and gain in the UK: Regional patterns of graduate retention and attraction



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Executive Summary

Report objectives

New workers with higher education qualifications can improve and level up a region's skills base and contribute significantly to regional economic and productivity growth. This report draws on Higher Education Statistics Agency data for the academic years 2015/16, 2016/17 and 2018/19 to explore graduate mobility patterns across the UK regions. The key objectives are to:

- Calculate the student and graduate retention and attraction rates for the nine English regions, Wales, Scotland and Northern Ireland and offer some possible explanations for the observed differences across regions.
- Provide a typology of UK regions based on the inflows and outflows of students and new graduate workers.
- Examine heterogeneous patterns of the retention and attraction rates of new graduates according to their gender, level of study and main area of the subject studied.
- Discuss the policy implications of this analysis and identify opportunities related to attracting skilled workers to sectors with significant growth potential and retaining graduates in regions outside of London.

Findings

- Inter-regional mobility is higher for students than for new graduate workers, as regions retain, on average, more new graduate workers after their studies (61.1%) than residents making the transition to becoming university students (56.3%).
- There are remarkable regional differences in terms of both student attraction and graduate employment. For instance, there is a clear North-South divide in the graduate attraction figures. In particular, of the total 2018/19 university graduates who moved to a different region for work, 65.3% moved to London, the East of England, the South East and the South West, whereas only 15.9% migrated to the northern English regions.
- Graduate retention rates are higher for women than for men. Specifically, the rates for women in the English regions range from 44.1% in the East Midlands to 75.3% in London, while the corresponding rates for men vary between 34.6% and 72.8% in the same regions (based on the 2018/19 cohort of graduates who were interviewed fifteen months after finishing their studies).
- Similarly, the likelihood of staying local is higher for new graduate workers who attended a postgraduate taught course (standing at 63.4% on average in the UK) than those who hold only a first degree (54.4%), whereas the attraction rates are more potent among the first-degree graduates (45.6%).
- Graduates with a qualification in Arts, Humanities, and Education are, by far, more likely than STEM and LEM graduates to stay in the same region of study for work. Conversely, regional attraction rates are generally higher among STEM graduates (standing at 46.6% on average in the UK) than those with higher education qualifications in other subject areas. This picture is partially associated with the increasing demand for particular high-level skills across regions.

Policy implications

The development of some key sectors with considerable potential for economic growth (such as the life sciences, low carbon, and digital industries) provides opportunities to improve graduate retention in the UK regions through creating high-quality jobs. For example, the technology sector has the potential to generate 52,000 new jobs by 2025 in the West Midlands, thus contributing to the UK economy by £2.7 billion. Therefore, it is crucial to align universities' knowledge offer with existing skills needs and to identify impediments to graduate retention, especially in regions with many skills shortage vacancies. This becomes particularly challenging in light of the existing skills mismatch issue at the national level. Universities have an important role to play in contributing to skills initiatives, regional economic strategies and recovery. This paper suggests they could capitalise on opportunities in the emerging sectors through greater provision of flexible learning and novel degree structures.

Introduction

It is well documented in the academic literature that recent graduates are highly geographically mobile once they finish their studies (Abreu et al., 2015), as they look for a job that suits their skills and ambitions. In the UK case, most students do not enter employment in the same local area as the University they attend (Faggian and McCann, 2009); rather moving to a different location. Together with the high mobility of students entering the university system, this creates a picture of young people (students and new graduate workers) moving around the UK. Previous research (HECSU, 2015), as reported in Whiteley et al. (2020) has distinguished four groups of students according to their patterns of regional movement:

- *Loyals* do not move region - they study and work in the region in which they were originally domiciled
- *Stayers* move away from their home region to another region to study and stay there to work
- *Returners* move to another region to study and then return home to work
- *Incomers* find work in a region away from both their home and where they studied.

Overall, these regional patterns of movement translate into gains of qualified labour for some regions but losses for others (also known as 'brain drain').

Using data from the Higher Education Statistics Agency (HESA) for the year 2015/2016 relating to the flows of students from their homes to universities and new graduate workers as they transition from university into employment¹, we have created a typology of UK regions in terms of their capacity to attract students and new graduate workers as well as their capacity to retain the students they attract as new graduate workers. As Hermannsson et al. (2014) have demonstrated in relation to Scotland, larger numbers of graduates in the labour market create a significant boost to regional GDP in the long-term. The boost to regional GDP is even larger than the expenditure impacts of Higher Education Institutions (HEIs), which are normally the focus of impact analyses. It is important to understand graduate mobility patterns since the mobility of graduates into employment across the UK is important in terms of addressing higher-level skills shortages (Whiteley et al., 2020).

Data and definitions

We define **student retention** as the proportion of university students that study in a region (r) that are originally from the same region over the total number of students at universities in that origin region. **Student attraction** relates to the proportion of university students that come from other UK regions (s) relative to the total number of students in the destination region.

$$\text{Student retention}_r = \frac{\text{Number of Students}_r^r}{\text{Total Students}_r}$$

$$\text{Student attraction}_r = \frac{\text{Number of Students}_s^r}{\text{Total Students}_r}$$

Subscripts (r and s) refer to the region of origin and superscripts to the region of destination.

A similar measure can be constructed for new graduate workers. Therefore, **graduate retention** is defined as the proportion of new graduate workers that find work in the region (r) where they studied over the total number of new graduate workers that studied in that region. **Graduate attraction** is defined as the amount of new graduate workers

¹ HESA – Destination of Leavers from Higher Education (DHLE) 2015/2016 provides information on the activities of students after they have left a higher education provider. Data is collected through a survey carried out approximately six months after students leave. It includes information about what the leaver is doing - whether studying, working or both. Where a leaver is in employment, it records the type of industry, sector, occupation type and location. Much of the data is also linked to data from the HESA Student record. This allows analysis of destinations by students' attributes such as sex, subject of study, qualification obtained and location of the HEI attended. This information was released on 20 July 2017.

from other UK regions (s) relative to the total amount of new graduate workers that find a job in that year in the region of destination (r).

$$\text{New graduate worker retention}_r = \frac{\text{Number of New graduate workers}_r^r}{\text{Total New graduate workers}_r}$$

$$\text{Graduate attraction}_r = \frac{\text{Number of New graduate workers}_s^r}{\text{Total New graduate workers}_r}$$

Note that these ratios have to add up: $\text{Number of Students}_r^r + \text{Number of Students}_s^r = \text{Total Students}_r$
 $\text{Number of New graduate workers}_r^r + \text{Number of New graduate workers}_s^r = \text{Total New graduate workers}_r$.

Regional analyses

Inter-regional mobility

If we calculate these indicators for the nine English regions, Wales, Scotland and Northern Ireland (Table 1), we find that inter-regional mobility is higher for students than for new graduate workers. In other words, regions retain more new graduate workers after their studies (61.1%) than residents making the transition to become university students (56.3%). This means that, out of the 270 thousand new graduate workers in the year 2015/2016, 165 thousand found a job in the same region where they studied for their degree and 105 thousand moved to a different region and found a job there. Previously, out of 270 thousand residents transitioning to become a university student, 152 thousand decided to stay in their home (i.e., origin) region for their university studies, while 118 thousand move to a different region².

Table 1 – Regional attraction and retention of students and new graduate workers – year 2015/2016.

Region	Total (Thousands)	Students			New graduate worker employment		
		Retention	Attraction	Total (Thousands)	Retention	Attraction	Total (Thousands)
North East (NE)	10	60.0%	53.8%	13	61.5%	20.0%	10
North West (NW)	29	65.5%	38.7%	31	67.7%	26.7%	30
Yorkshire & the Humber (Y&H)	20	60.0%	52.0%	25	56.0%	30.0%	20
East Midlands (EM)	18	44.4%	60.0%	20	45.0%	37.5%	16
West Midlands (WM)	25	56.0%	44.0%	25	56.0%	36.4%	22
East of England (EE)	24	33.3%	46.7%	15	53.3%	57.9%	19
London (LD)	40	55.0%	42.1%	38	73.7%	51.7%	58
South East (SE)	37	45.9%	55.3%	38	44.7%	47.1%	34
South West (SW)	21	47.6%	52.4%	21	52.4%	45.0%	20
Wales	14	64.3%	35.7%	14	64.3%	25.0%	12
Scotland (ST)	22	90.9%	13.0%	23	82.6%	9.5%	21
Northern Ireland (NI)	10	70.0%	0.0%	7	100.0%	12.5%	8
UK	270	56.3% (152)	43.7% (118)	270	61.1% (165)	38.9% (105)	270

Source: Own elaboration using data from HESA (Higher Education Statistics Agency), 2018.³

As can be seen in Table 1, regional differences are quite significant in terms of both student attraction and graduate employment. In relation to student attraction, the East Midlands and the South East are performing particularly strongly. The centrality of the East Midlands as well as the presence of leading universities such as Loughborough University, the University of Leicester and University of Nottingham and Nottingham Trent University are likely to explain the high student attraction rate. The South East is home to universities including the Universities of Oxford, Reading, Southampton, Surrey and Kent. Attractiveness in the South West is likely to be linked to opportunities in Bristol. Further research would be useful to investigate the extent to which students are attracted to these regions based on course quality and availability as well as other factors such as location, tuition fees, cost of living, attitudes to debt. Existing research (e.g. Burge et al, 2014) indicates that the quality of education, and social experience on offer

² Note that in these figures just the new graduate workers are included (i.e. those who did not have a job are excluded), so by definition those who found a job after 15 months (270,000 for the new graduates of the year 2015/2016) are included.

³ The data source does not distinguish between part and full-time. It relates to 2015/16 leavers in general, indicating where they ended up when surveyed 15 months after graduation. (Note that only those completing the survey are included in the analyses.)

and the longer-term career prospects are key considerations when students choose between universities. Swinney and Williams (2016) stress the role of short- and long-term job opportunities in driving graduate migration patterns. However, up to now limited research has investigated the importance of employment factors vis-à-vis non-employment factors in the location and mobility decisions of graduates. This is a key area of focus for future work.

The regions which are the most successful in terms of attracting students are not the most successful regions at attracting new graduate workers. Whilst only the sixth highest-ranking region in terms of the percentage of students that it attracts, the East of England attracts the highest percentage of new graduate workers. It is likely that job opportunities in Cambridge are particularly important in attracting students to the region. London performs more strongly in terms of attracting new graduate workers than students. One fifth of the total number of new graduate workers who left university in 2016 found a job in London (21.5%, around 58 thousand). This may be because whilst some people are put off from studying in London due to the high student living costs in London, they feel that wider range of graduate opportunities on offer in London compared to the rest of the UK make the move more viable once they are graduates.⁴ High graduate attraction figures for London fits with previous research by Centre for Cities which argued that “the brain drain to London is not just about quantity, but about composition too. London pulls in many more graduates than its share of jobs would suggest, and this is even more prominent for high achievers from Russell Group universities” (Swinney and Williams, 2016). Recent analysis by the Industrial Strategy Council emphasises the role of job prospects and salary when graduates are deciding whether to remain in their town or city for employment or not. In 2019, London had a lower proportion of low-paid employee jobs and a higher proportion of higher-paid jobs than the rest of the UK (Office for National Statistics, 2019). Given the high proportion of students that are attracted to the South East (which includes Oxford), one may expect the region to attract a higher percentage of new graduate workers than it currently does. Future research could investigate the role the area’s proximity to London plays in terms of how graduates perceive opportunities in the region. The attraction of students and new graduate workers to Scotland and Northern Ireland is notably small, while the retention rate is correspondingly high (as noted below). Attractiveness in the South may be linked to opportunities and the standard of living/ culture in Bristol.

Table 1 also shows that new graduate workers are principally retained in areas with large cities (e.g. London, and Manchester and Liverpool in the North West). In some respects, the West and East Midlands can be considered to be underperforming in terms of new graduate worker retention – but the regional scale of analysis may disguise marked intra-regional variations here. Scotland, Northern Ireland and also, to a lesser extent, Wales retain more students than average but work as independent systems more or less with very low mobility. High graduate retention in Scotland could be important in relation to future potential independence debates in Scotland. High skill levels from graduate retention are likely to help to support the Scottish economy, at least in the short-term, if Scotland were to become independent.

Analysis of the data in Table 1 enables the following typology of regions of Table 2 to be built.

Table 2 – Typology of UK regions regarding inflows and outflows of students and new graduate workers

Typology	Regions	Description
1	North East, Yorkshire & the Humber	Regions that attract and retain students but export new graduate workers – brain drain
2	East Midlands, West Midlands	Attractors of students but exporters of new graduate workers – brain drain
3	London	Regions that retain and attract new graduate workers – brain gain
4	East of England, South East, South West	Regions with low retention and high attraction of both students and new graduate workers – high mobility
5	North West, Wales, Scotland, Northern Ireland	Regions with high retention and lower attraction of both students and new graduate workers – low mobility

⁴ Average student rent is £716.90 in London compared to £437.40 in the rest of the UK (Natwest, 2020).

We have divided the regions into five different groups: regions that suffer brain drain of graduates that were originally from the same region and from other regions (1), regions that cannot retain their students or their new graduate workers (2), regions that retain and attract new graduate workers (3), and regions with high (4) and low mobility (5) of both students and new graduate workers. This can be seen also in Figure 1.

Figure 1 – Diagram of the typology of UK regions regarding student and new graduate worker retention and attraction

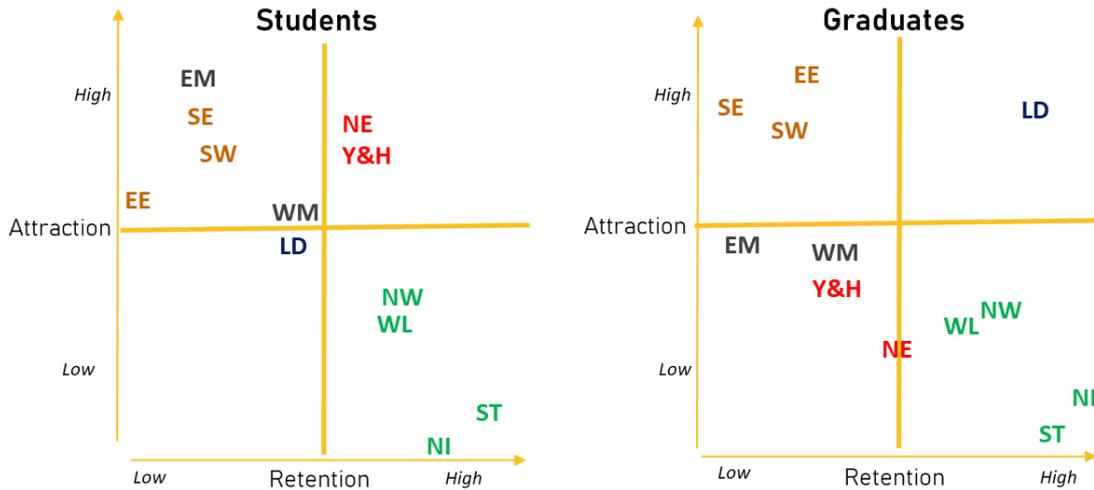
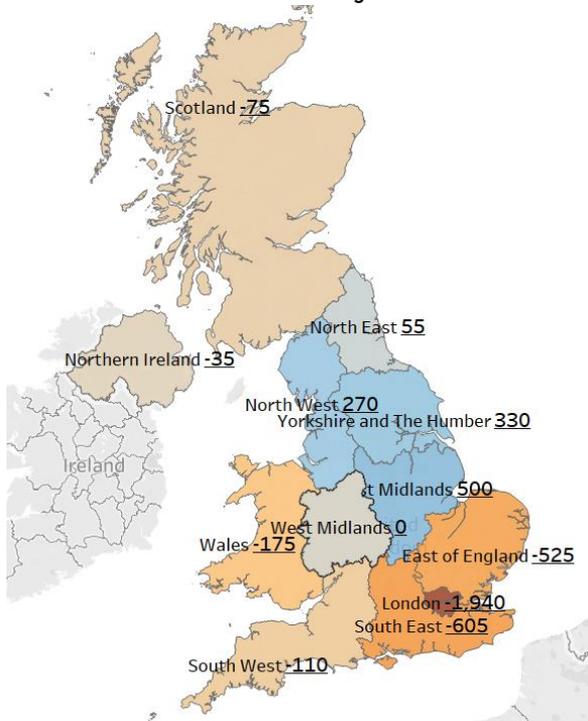


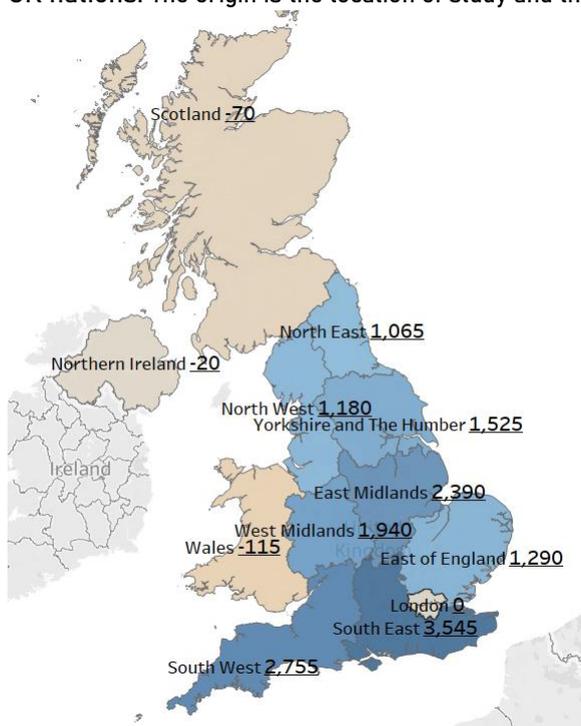
Figure 2 – Map showing net flows of undergraduate students between the West Midlands and the other English regions and other UK nations. The origin is the location of study and the destination is the location of employment.



Source: Own elaboration using data from HESA (Higher Education Statistics Agency), 2018⁵.

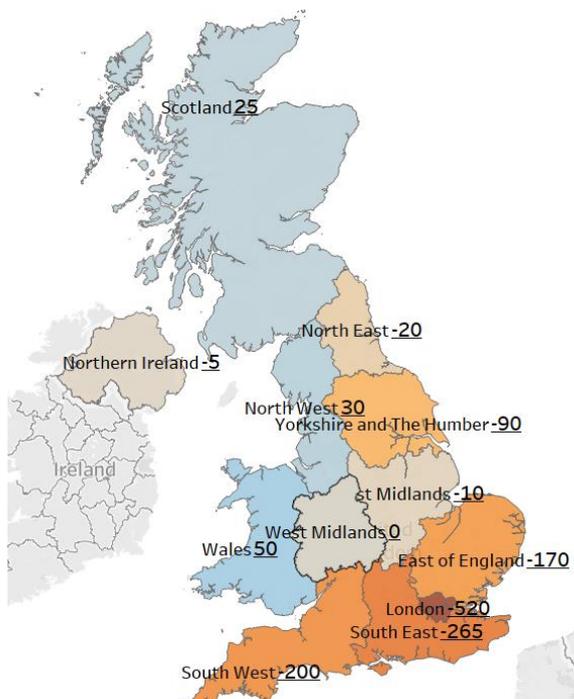
⁵ The data source does not distinguish between part and full-time study. It relates to 2016/17 leavers in general, indicating the location of work they report when contacted for the survey 12 months after graduation. Students not in employment are excluded. Note that gross flows are significantly larger than net flows shown.

Figure 3 – Map showing net flows of undergraduate students between London and other English regions and other UK nations. The origin is the location of study and the destination is the location of employment.



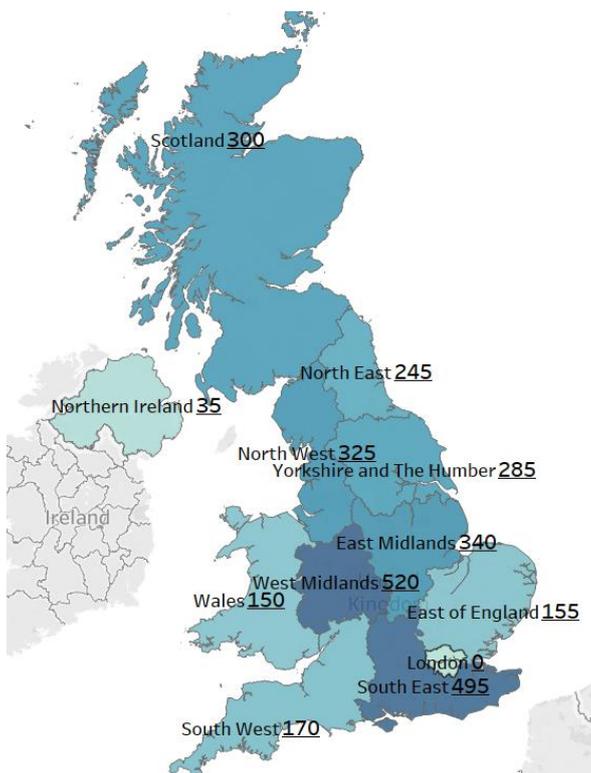
Source: Own elaboration using data from HESA (Higher Education Statistics Agency), 2018.

Figure 4 – Map showing net flows of postgraduate students between the West Midlands and the other English regions and other UK nations. The origin is the location of study and the destination is the location of employment.



Source: Own elaboration using data from HESA (Higher Education Statistics Agency), 2018.

Figure 5 – Map showing net flows of postgraduate students between London and the other English regions and other UK nations. The origin is the location of study and the destination is the location of employment.

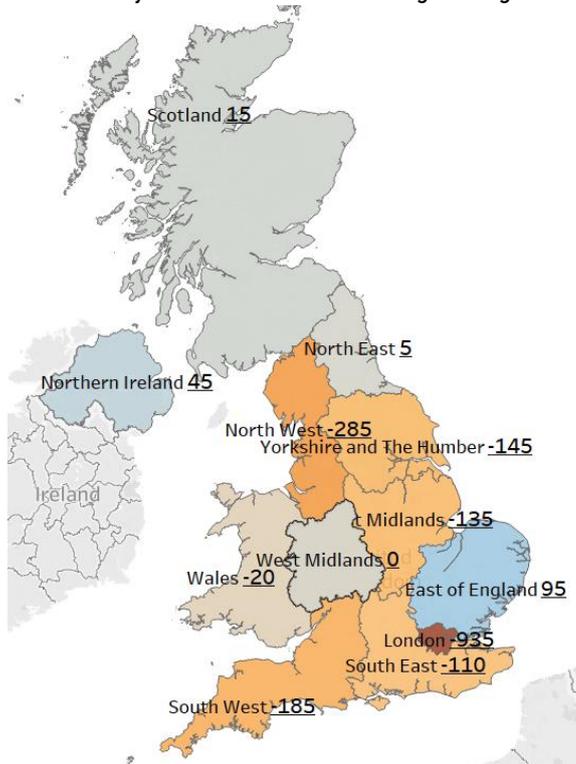


Source: Own elaboration using data from HESA (Higher Education Statistics Agency), 2018.

Figures 2-5 contrast undergraduate and postgraduate retention in the West Midlands and London. The region of reference in each map is identified by the thicker borders. The numbers shown above each region indicate a total net flow of students, i.e. the number of students who move from that region to the reference region, minus the number of students who move in the opposite direction. A positive number above a region therefore indicates that the reference region is gaining net students from it, while a negative number indicates that it is losing students to it. For example, the figure of -285 over the North West in Figure 6 indicates that in a given year, the West Midlands loses 285 more students to the North West (who go on to graduate employment) than it gains from the North West. As this data refers only to students who are survey respondents known to be in work, it is likely a significant understatement of the total number of students who move between a given pair of regions.

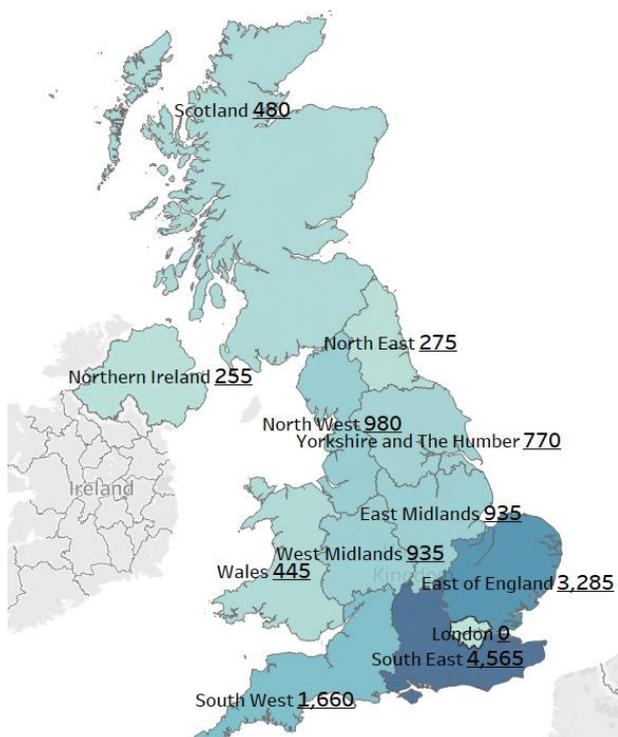
The Figures indicate that the West Midlands loses undergraduate and graduate students primarily to London and the South East when they enter employment. The West Midlands region predominantly gains graduates from the East Midlands, Yorkshire and the Humber and the North West. The importance of London for graduate employment is demonstrated by how London imports graduates (both those who have completed undergraduate and postgraduate level degrees) from all regions. This corresponds to the finding of the Prospects (2020) 2020/21 'What do graduates do survey?' that London is the most popular destination for graduate employment (with around 25.5% of graduates working there 15 months after graduation). The survey indicates that outside of London the most important locations of graduate employment are: Greater Manchester, the West Midlands (around Birmingham), West Yorkshire, Glasgow, Merseyside, South Yorkshire (around Sheffield), Bristol and Edinburgh. A key question is whether London will continue to attract graduates to such an extent following the Covid-19 pandemic. Whilst the labour market overall was strongly hit in 2020 and the first part of 2021 with below normal levels of footfall and vacancies, the graduate economy remained relatively strong vis-à-vis that for some other qualification groups (Ball, 2020). Nonetheless, this data relates to the period before the second and third lockdowns in England took place.

Figure 6 – Map showing loss of students to undergraduate study and employment between the West Midlands and the other English regions and other UK nations. The origin is where the student leaves secondary school, and the destination the location they live and work in following undergraduate study.



Source: Own elaboration using data from HESA (Higher Education Statistics Agency), 2018.

Figure 7 – Map showing loss of students to undergraduate study and employment between London and the other English regions and other UK nations. The origin is where the student leaves secondary school, and the destination the location they live and work in following undergraduate study.



Source: Own elaboration using data from HESA (Higher Education Statistics Agency), 2018.

The maps indicating 'Loss of students to undergraduate study and employment' connect domicile region to graduate employment region. Although this does not quite correspond either to graduate retention or student retention, it adds to understanding of how many graduates the West Midlands university system is losing to other regions (in Figures 3-5 above) by showing how many pupils in the West Midlands end up finding graduate employment somewhere else, wherever they studied. It indicates that the West Midlands is currently lagging behind the majority of other regions in England in terms of retaining pupils once they enter Higher Education and employment. Yet it needs to be borne in mind that some universities in the West Midlands (as in other regions) predominantly draw students from their local area and are mindful that many of their students want to stay in the region. Hence many universities are implementing a variety of initiatives to raise demand for graduates amongst local firms, as well as equipping graduates to consider self-employment as an option.

Heterogeneity in graduate retention and attraction rates

This section presents the graduate retention and attraction rates across the UK regions by gender, level of study and main subject area of study, based on the most recent data from HESA's Graduate Outcomes Survey (GOS)⁶ for the academic year 2018/19.

Gender

Tables 3 and 4 report the movement of graduates from the provider region to the employment location for women and men, respectively⁷. A significant number of new graduates remain in their university region for work fifteen months after finishing their studies. However, the retention rates vary remarkably across regions and are higher for women than for men (see Figure 8). Specifically, the graduate retention rates for women in the English regions range from 44.1% in the East Midlands to 75.3% in London, while the corresponding rates for men vary between 34.6% and 72.8% in the same regions. Interestingly, the difference in the retention rates between genders is more pronounced in the North East, Wales and the West Midlands (standing at 10.9, 10.3, and 10.1 percentage points, respectively). These 'raw' figures imply a notable impact of gender on the probability of remaining locally for work after graduation, as women seem less likely to relocate than men. This picture might be associated with better occupation opportunities and the quality of jobs offered to men compared to women, particularly in the early stages of their careers, thus representing another reflection of gender inequality. A second interpretation may relate to disparities in the willingness to move and differing attitudes towards transregional job offers between genders, as women might find less attractive such offers in terms of wages and career prospects (see a relevant discussion in Abraham et al., 2019). Moreover, a higher percentage of women than men enter jobs in the public sector and such opportunities are more geographically evenly spread than private sector jobs. Other factors explaining these discrepancies in the likelihood of staying local could pertain to gender-specific norms about long-distance moves and stereotypical perceptions concerning female employment and career advancement, especially among the group of young graduates who studied in the same region in which they grew up.

⁶ The GOS explores the employment destinations of graduates fifteen months after completing their studies. The figures presented in this section show the number and proportion of new graduates within each provider region and region of employment, irrespective of where they were domiciled initially. The data used for this analysis was extracted from the Heidi Plus platform of HESA.

⁷ The figures presented in this section refer to complete responses. The rate of complete responses for the 2018/19 GOS was 48%, while the rate of partially completed responses was 52%. This could potentially lead to a non-response bias if the likelihood of responding to the survey differs by specific characteristics (such as gender, age, subject area of study, or location of employment). However, HESA has decided not to apply weighting methodologies (which aim to render the sample more representative of the wider population) to the GOS, as weighting appears to make little difference to the estimates related to employment and study.

Table 3 Number of female graduates by region of higher education provider and region of employment – 2018/19

Provider region	Region of employment												UK
	NE	NW	Y&H	EM	WM	EE	LD	SE	SW	Wales	ST	NI	
North East (NE)	3,550	365	535	120	110	175	905	240	110	30	100	50	6,290
North West (NW)	235	10,250	785	355	720	305	1,080	455	275	405	135	225	15,225
Yorkshire & the Humber (Y&H)	340	1,270	7,015	875	410	450	1,315	530	215	80	95	30	12,625
East Midlands (EM)	110	475	710	5,050	1,060	930	1,775	870	295	85	65	25	11,450
West Midlands (WM)	125	615	295	740	7,170	515	1,765	875	640	220	75	35	13,070
East of England (EE)	45	140	145	260	145	4,160	2,200	800	195	55	60	25	8,230
London (LD)	70	320	195	215	275	1,305	17,010	2,455	440	105	145	55	22,590
South East (SE)	130	570	390	425	640	1,300	5,090	8,825	1,535	260	105	50	19,320
South West (SW)	40	220	120	170	375	365	2,045	1,410	5,720	350	80	35	10,930
Wales	35	280	85	90	320	155	490	425	605	4,485	40	25	7,035
Scotland (ST)	140	275	150	95	90	170	890	255	130	40	11,590	155	13,980
Northern Ireland (NI)	25	40	20	20	30	35	105	45	35	15	50	3,145	3,565
UK	4,845	14,820	10,445	8,415	11,345	9,865	34,670	17,185	10,195	6,130	12,540	3,855	144,310

Note: The number of graduates exclude those whose employment location is outside the UK or unknown and those with other/unknown gender. The figures in each cell are rounded to the nearest multiple of 5, in line with HESA's disclosure control. The provider region refers to the location of the higher education institution, based on the main administration building.

Source: Own elaboration using the Graduate Outcomes Survey data from HESA (Higher Education Statistics Agency), 2018/19.

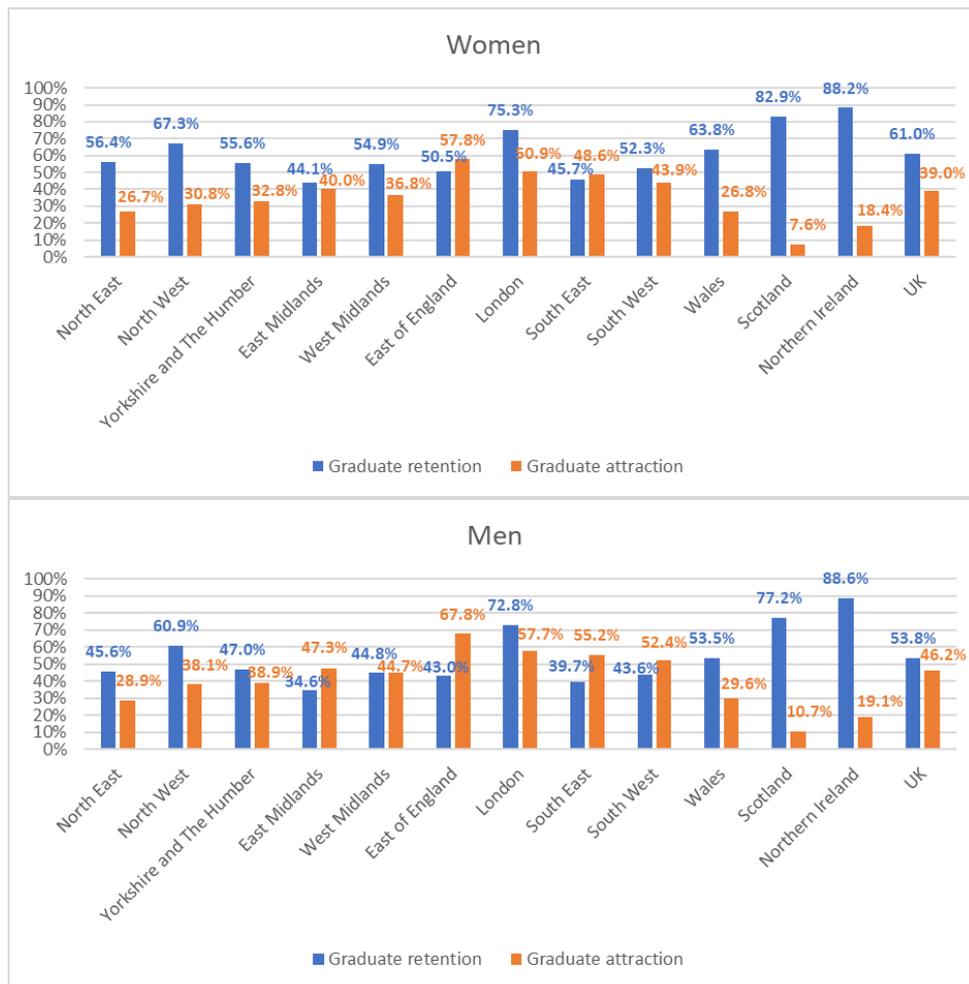
Table 4 Number of male graduates by region of higher education provider and region of employment – 2018/19

Provider region	Region of employment												UK
	NE	NW	Y&H	EM	WM	EE	LD	SE	SW	Wales	ST	NI	
North East (NE)	2,125	310	400	135	105	185	855	275	105	40	90	40	4,665
North West (NW)	115	5,740	545	245	470	240	970	360	235	235	110	160	9,425
Yorkshire & the Humber (Y&H)	200	885	3,820	600	300	395	1,100	445	205	70	85	20	8,125
East Midlands (EM)	105	360	420	2,805	815	715	1,615	750	345	75	75	30	8,110
West Midlands (WM)	100	490	240	510	3,940	450	1,575	755	485	145	75	30	8,795
East of England (EE)	30	120	85	160	105	2,190	1,660	515	155	35	25	15	5,095
London (LD)	60	240	155	185	245	990	10,975	1,585	380	75	145	35	15,070
South East (SE)	95	455	290	320	495	955	4,105	5,280	995	170	115	35	13,310
South West (SW)	35	210	100	150	275	380	1,780	1,075	3,355	265	55	20	7,700
Wales	25	215	70	95	270	140	470	445	610	2,760	40	20	5,160
Scotland (ST)	95	225	115	100	90	155	740	270	150	45	7,030	90	9,105
Northern Ireland (NI)	5	25	10	15	20	15	85	35	25	5	30	2,090	2,360
UK	2,990	9,275	6,250	5,320	7,130	6,810	25,930	11,790	7,045	3,920	7,875	2,585	96,920

Note: The number of graduates excludes those whose employment location is outside the UK or unknown and those with other/unknown gender. The figures in each cell are rounded to the nearest multiple of 5, in line with HESA's disclosure control. The provider region refers to the location of the higher education institution, based on the main administration building.

Source: Own elaboration using the Graduate Outcomes Survey data from HESA (Higher Education Statistics Agency), 2018/19.

Figure 8 – Graduate attraction and retention rates by region and gender



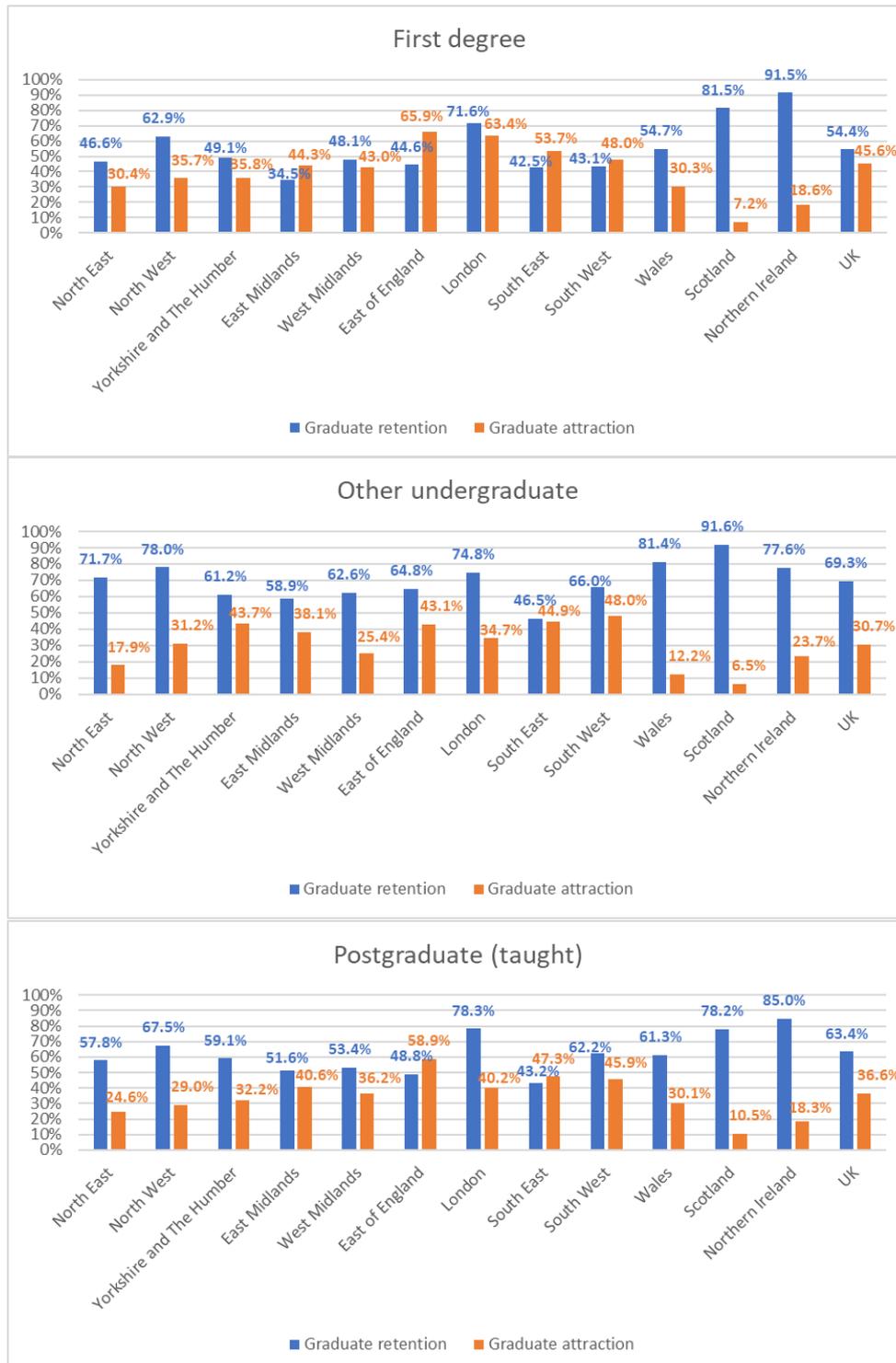
Source: Own elaboration using the Graduate Outcomes Survey data from HESA (Higher Education Statistics Agency), 2018/19.

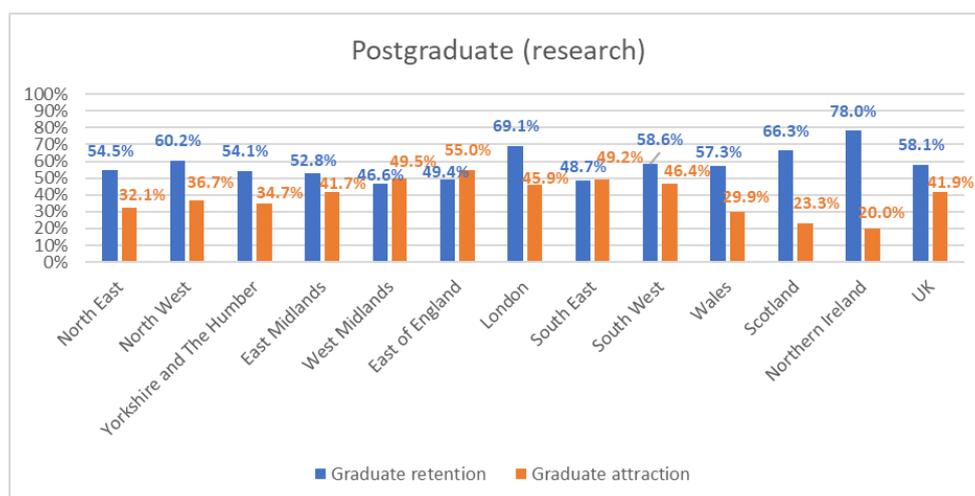
Level of study

As Figure 9 reveals, there is a substantial interrelationship between the graduates' level of study and the regional retention/attraction rates. In particular, the retention rates are generally higher for new graduate workers who attended a postgraduate taught course (including masters degrees and other diplomas/certificates, such as the Postgraduate Certificate in Education) than those who hold only a first degree. The differences in graduate retention rates between these two levels of study are more prominent in the South West (19 percentage points) and the East Midlands (17.1 percentage points) than in other regions. The above figures likely suggest that students make rational decisions regarding the region of their postgraduate studies, which, in many cases, is inextricably linked with their subsequent employment destination and career goals. A postgraduate qualification in a specialised field of study can open up more opportunities in the regional labour market than a first degree alone. In addition, the pattern described above could also imply that the postgraduate programmes of universities have placed a strong focus on establishing collaborations and developing networks with local businesses and have taken relevant initiatives that enhance the labour market prospects of their graduates within the region. Nevertheless, the new graduate workers with "other undergraduate" qualifications (such as foundation degrees, Higher National Diplomas, Higher National Certificates, Diplomas of Higher Education, National Vocational Qualifications, and so forth), who, however, cover a small share of the total number of graduates (6.4%), are the most likely to stay locally than others fifteen months after graduation. A possible explanation for this is that students aiming for these qualifications (such as vocational courses) are more likely to be "loyals" (i.e., to study and work in the same region where they were originally domiciled).

On the contrary, the attraction rates are more potent among the new workers who hold a first degree, standing at 45.6% on average in the UK. The difference in the attraction rates between the employed graduates with a first degree and those who also hold a postgraduate taught qualification is striking for London (23.3 percentage points) and remains remarkable for the East of England, the West Midlands, and the North West (7.0, 6.8, and 6.7 percentage points respectively). The East of England (58.9%) witnesses the highest graduate attraction rate among the survey respondents with a postgraduate taught degree, followed by the South East (47.3%) and the South West (45.9%). In sum, whilst the above figures confirm the view that graduates are disproportionately more likely to move to popular destinations with increased employment opportunities and well-paid jobs (such as London and the East of England), they also reveal that this pattern is not consistent across different levels of study.

Figure 9 – Graduate attraction and retention rates by region and level of study





Note: Of the 242,945 GOS respondents of the 2018/19 academic year with a known location of employment within the UK, 60.9% hold only a first degree, 6.4% other undergraduate qualifications, 28.5% a postgraduate taught degree and 4.2% a postgraduate research degree.

Source: Own elaboration using the Graduate Outcomes Survey data from HESA (Higher Education Statistics Agency), 2018/19.

Subject area of study

The post-university activity of graduates also varies by the area of subject studied (STEMM (Science, Technology, Engineering, Mathematics and Medicine), LEM (Law, Economics and Management), and Other – see Figure 10 and its note for further details). Graduates with a qualification in “other” subject areas (such as Arts, Humanities, and Education) are, by far, more likely to stay in the same region of study for work after graduating. In particular, the average retention rate among “other” graduates stands at 61.8% in the UK. London (75.8%), the North West (66.9%) and the West Midlands (59.4%) retain the highest percentage of those graduates among all English regions. This pattern may be associated with the demand for particular skills in these regions. For instance, the 2018/19 GOS data show that 22.8% of all recent graduates in the West Midlands are employed in the Education sector, which demonstrates the highest proportion compared to all UK regions.

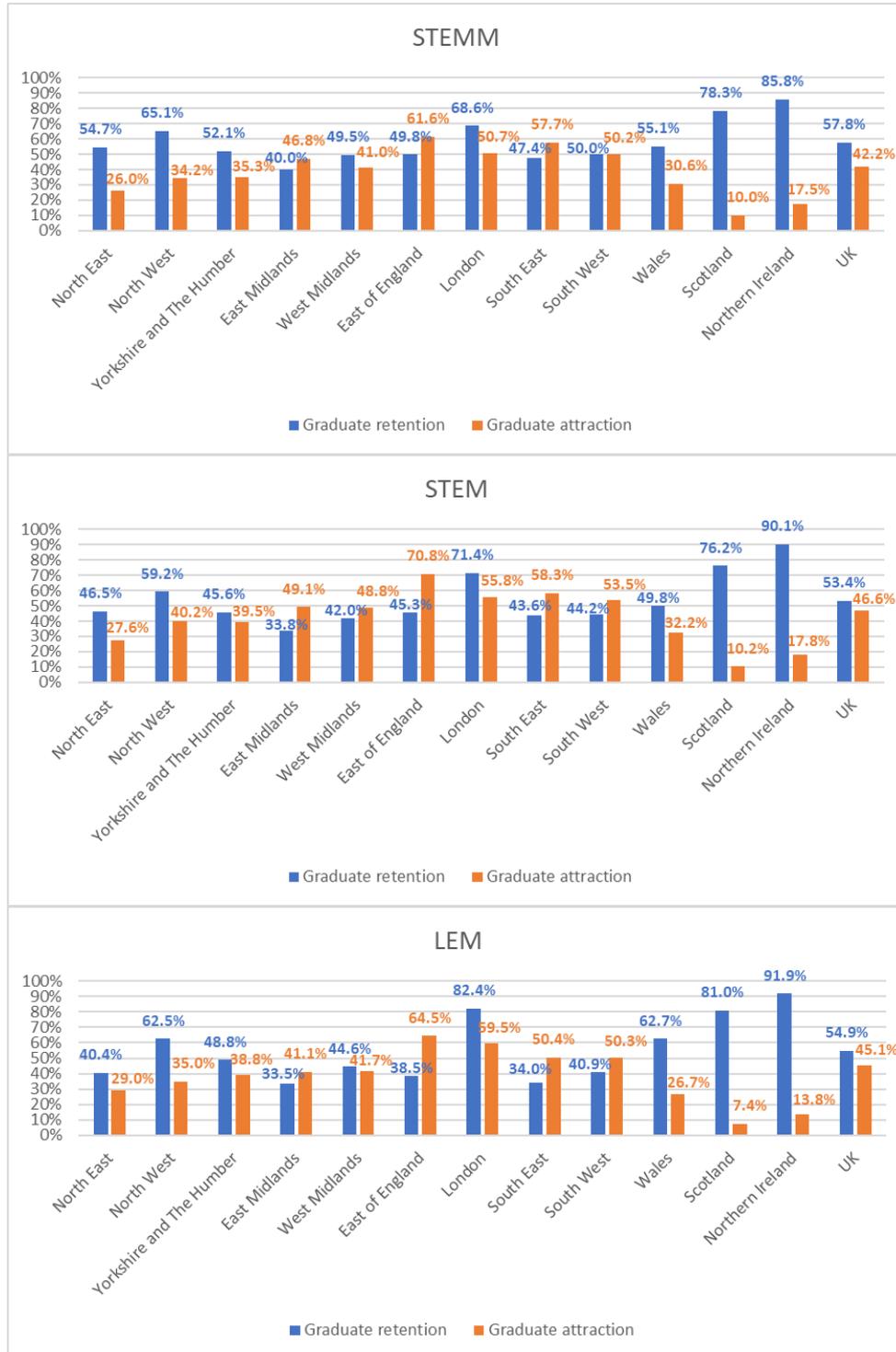
STEMM new graduates are overall more likely to opt to work in the same region where they studied than LEM graduates across most English regions, except for London. Specifically, the difference in the retention rates between these two broad disciplines of study (STEMM and LEM) is higher in the North East (14.3 percentage points), the South East (13.3 percentage points) and the East of England (11.3 percentage points). London (68.6%), the North West (65.1%) and the North East (54.7%) are the regions of England that retain the largest proportion of STEMM graduates. However, it appears that medicine graduates (that is, those who studied “Medicine & dentistry” or “Subjects allied to medicine”) skew the results in favour of the STEMM category. Indeed, if we exclude the medicine-related subjects and focus only on STEM (Science, Technology, Engineering and Mathematics) graduates, the retention rates decrease in most regions, and the national average drops to 53.4% (from 57.8%). This difference in the retention rates between STEM and STEMM graduates could be partially attributed to increased opportunities to access jobs within the region of study in specific sectors, such as the “Human health and social work activities”. In most UK regions, the latter sector attracts the highest number of total new graduate workers among all sectors – for example, the share of this sector stands at 23.5% in the West Midlands, 27.7% in the North East, and 24.3% in the North West.

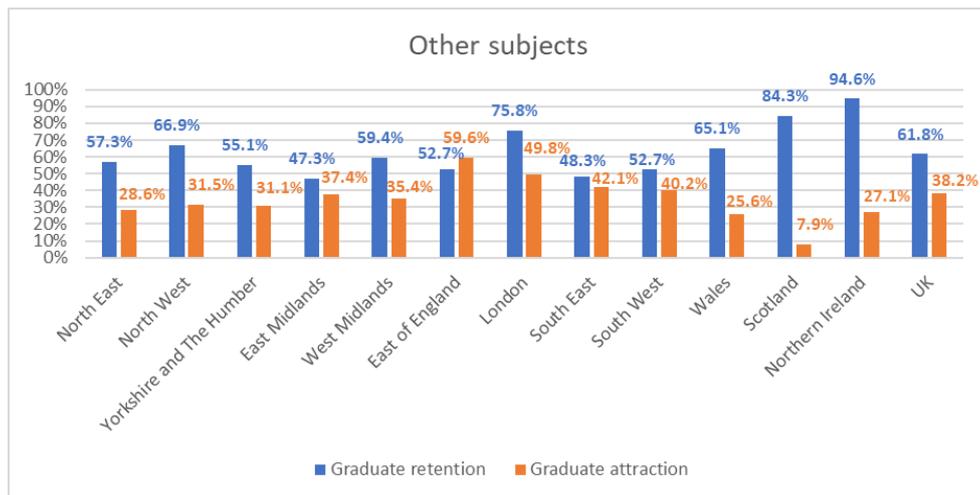
Conversely, the East Midlands (33.8%) sees the lowest retention rate among STEM graduates in the UK, followed by the West Midlands (42.0%) and the South East (43.6%). The low retention rates observed in these regions do not necessarily imply that recent graduates relocate for work. These figures could also reflect that a significant proportion of new graduate workers might still reside in their home/study region and commute to work in London because of good transport links. This should be particularly relevant in the context of the Covid-19 pandemic, which has resulted in a notable amount of the labour force working primarily from home.

Finally, the regional attraction rates are generally higher among STEM graduates than those holding higher education qualifications in other subject areas, standing at 46.6% on average in the UK. These figures likely suggest that there

are certain pull factors connected with increased demand for high skills in specific sectors (such as digital, engineering, and scientific skills).

Figure 10 – Graduate attraction and retention rates by region and subject area of study





Note: The subject areas are grouped according to the 19 main codes of the “Joint Academic Coding System” (JACS) classification. **STEMM** (Science, Technology, Engineering, Mathematics and Medicine) subjects include “Physical sciences”, “Mathematical sciences”, “Computer science”, “Biological sciences”, “Veterinary science”, “Engineering & technology”, “Medicine & dentistry”, “Subjects allied to medicine”, “Agriculture & related subjects”, and “Architecture, building & planning”.

STEM subjects exclude “Medicine & dentistry”, and “Subjects allied to medicine”.

LEM (Law, Economics and Management) subjects refer to “Law”, “Business & administrative studies”, and “Social studies”.

Other subjects include “Mass communications & documentation”, “Languages”, “Historical & philosophical studies”, “Creative arts & design”, and “Education”. The “combined subjects” (i.e., those covering joint qualifications in one or over one subject code, such as “BSc in Economics and Mathematics”) are excluded from the analysis because of the small number of observations across most regions.

Source: Own elaboration using the Graduate Outcomes Survey data from HESA (Higher Education Statistics Agency), 2018/19.

Discussion

It is generally assumed that new graduate workers are more skilled than many other workers and therefore have a higher potential labour productivity rate, emphasising their importance for increasing regional economic growth in the future. Research by Hermannsson et al (2014) in Scotland indicates that Higher Education Institutions generally significantly boost regional GDP through their long-term supply-side impacts. For example, internationally graduates have been central to the growth of spinouts and new sectors in Zurich and the Ruhr region, especially in Bochum. In Zurich, academic institutions such as the Swiss Federal Institute (ETHZ) and the University of Zurich (UZH) have supported the development of the health and life sciences sector, training a large number of highly skilled graduates in the sector every year who largely remain in the city (PA Consulting and City-REDI, 2019). UZH is the highest ranked university within continental Europe (Lawton-Smith et al, 2016). Spinoffs have been supported through the University of Zurich’s Life Sciences Fund, designed to promote innovation in the Swiss life science and biotechnology sectors. Over 100 spinoffs have been supported at UZH since 1999, with a very high rate of survival (University of Zurich, 2017). In the Ruhr region, SMEs are increasingly developing as a result of research within universities and corporate laboratories in the area. The number of students in the Ruhr region more than doubled between 1985 and 2015. Several cities such as Bochum have embraced the concept of UniverCity, designed to strengthen economic and social links between cities and their universities. The concept was important in supporting the establishment of technology centres and business incubators in the 1980s and the 1990s (Schwarze-Rodrian, 2016). Establishing the new universities has been cited as an important factor in improving the attractiveness of the region for companies and citizens by increasing demand for highly skilled workers and driving research-based innovation (Oei et al, 2019).

Nonetheless, it is important to consider the question of whether lower new graduate worker retention is necessarily a bad thing for regions. New graduate workers who move away for their first job may return subsequently bringing with them knowledge and experience from elsewhere. In a similar vein, the effect of geographical mobility on career outcomes may be particularly beneficial for graduates from lower socio-economic backgrounds (Universities UK, 2017), although they are less likely to relocate for work than others. Moreover, international students now represent a fifth of all students attending UK Higher Education Institutions (UK Council for International Student Affairs, 2019). Over three quarters of international students starting in Higher Education are from outside the EU. Given that most

non-EU students leave the UK after completion of their studies, an interesting angle to explore in future research is the extent to which regions with high numbers of international students benefit from international graduates leaving and ‘advertising’/ maintaining links with their place of study once they have left the area. Existing research demonstrates a wide range of benefits for the UK from attracting international students. In terms of influence, one of the benefits identified is that international students often become informal ambassadors for the UK thanks to an emotional bond they form with the country during their studies. Some facilitate educational, cultural, developmental and business links and collaborations between their home country and their UK (Mellors-Bourne et al, 2013).

Conversely, further research is required to investigate the extent to which high levels of graduate retention may be a sign of lack of dynamism in some areas if high graduate retention prevents new ideas from being brought into the labour market. Analysis of the impact of graduate retention on economic development needs to consider the alignment or mismatch between the structure of industry regions and the extent to which jobs in that region benefit from high or medium level skills.

Conclusions

One in three new graduate workers who moved to a different region for work moved to London. Furthermore, the North-South divide is quite clear: looking at the case of the attraction of new graduate workers, 65.3% of them moved to find a job in London, the East of England, the South East and the South West, whereas only 15.9% of new graduates migrated to the northern regions of England (based on the Graduate Outcomes Survey data for the 2018/19 academic year).

These mobility patterns fit with existing studies, which argue that regional and local labour market conditions in destination locations are very important for attracting new graduate workers once they have finished studying (Dotti et al., 2013). As Faggian and McCann (2009) find the likelihood of migration depends on the relative economic attractiveness of the potential destination in comparison to the origin location. This means that having a university is not enough to retain students in a region after graduating. Evers (2019) uses the analogy of a “cathedral in the desert”, where students obtain their degree before leaving because of a lack of industry demand for their skills. This emphasises the importance of universities engaging with civic partners to support growth in their regions.

In the particular case of the UK, London emerges clearly as the region with most regional brain gain. This confirms the hypothesis of Fielding (1992) and the findings of Champion et al. (2014) where new graduate workers perpetuate the concept of London as an “escalator region”. The potential of progression and the agglomeration effects attract them in the form of a London premium (i.e. higher revenues) that second-order cities cannot offer to the same degree. Given that the probability of choosing a specific location for work depends on various social, spatial and professional factors (see Kitagawa et al., 2021 and the papers cited therein), it is essential to shed more light on some of these determinants that influence graduates’ decisions. In this context, the forthcoming WMREDI report on “Graduate pathways: Identifying patterns of regional retention and attraction” utilises the Graduate Outcomes Survey for the academic year 2018/19 to explore how the regional graduate retention and attraction rates differ by individual characteristics (such as ethnicity and academic ability), type of university attended (e.g., Russell Group, Post-1992 institutions), industry sector and level of skilled employment.

Policy recommendations

There could be opportunities to improve graduate retention through creating high quality jobs in key sectors with potential for future growth. One such is life sciences and diagnostics, which has received new prominence as part of post-Covid-19 recovery planning. Development in the life sciences sector could benefit areas such as the East and West Midlands as life sciences expertise is particularly concentrated in Nottingham, Loughborough and Birmingham. Covid-19 has enabled the sector to successfully innovate new ways of working and digital healthcare (Darino et al, 2020), potentially supporting growth in the next normal. Already, investment in the life sciences sector has been announced. The government has committed £1.3 billion to the Department for Health and Social Care for research and

development including on Covid-19, supporting the wider UK life sciences sector (Gov.uk, 2020). A £210M world-class life science campus has been announced in Birmingham. The campus is designed to catalyse the development of the life sciences cluster in the city and wider West Midlands. It is hoped the site will create 10,000 new jobs, and contribute more than £400m GVA to the local economy by 2030 (University of Birmingham, 2020).

There may also be opportunities linked to the green recovery and growth of the low carbon sector. Recent research by the London School of Economics argues that investing in zero-carbon goods and services and developing a carbon resilient economy can be achieved rapidly. It also emphasises such investment would “*deliver significant benefits in terms of both generating employment and stimulating demand in the short term, while building productive capacity for innovation-led growth in the medium to longer term*” (Unsworth et al, 2020, p.2). Another strand of the WMREDI research programme is investigating Universities’ broader contribution to skills initiatives, local and regional economic strategies and economic resilience and recovery in the West Midlands. Early findings from this project show universities within the West Midlands are already developing teaching and research provision to capitalise on opportunities in emerging sectors and equip graduates with the skills required by employers in these new industries (Taylor et al, 2021). For example, the West Midlands Combined Universities are supporting professions they are strong in to adapt to future skills needs (e.g. agrifood, AI, future of healthcare, big data, digital skills, and cyber security). Workers employed in the digital industries are expected to play a crucial role in improving and levelling up the West Midlands’ skills base. Specifically, the tech sector has the prospect of generating 52,000 new jobs by 2025, thus contributing to the UK economy by £2.7 billion (Gov.uk, 2021). This implies that university graduates should cover a large part of the demand for such high-level skills. However, this becomes more challenging considering the existing skills mismatch issue at the national level, given that 7 million employees are predicted to be under-skilled for their jobs by 2030 (Industrial Strategy Council, 2019). Hence, from a policymaking viewpoint, it is imperative to align universities’ knowledge offer with the existing skills needs and identify the impediments to graduate retention, particularly in regions with many skills shortage vacancies.

Addressing the regional differences outlined above is also related to current debates regarding the future of Further Education and Higher Education. With rapidly changing skills demands and rapid technological innovation and adoption of new technologies, flexible learning is becoming all the more important (CBI, 2019; Lyons et al, 2020). Will the success of graduate retention in regions increasingly depend on the extent to which universities embrace more novel degree structures where people can move more easily between periods of employment and training? Could areas, which are struggling, seek to adapt by developing such courses first? As recovery progresses, it would be interesting to explore how easy it is to reduce skills mismatch in different regions.

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