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Abstract

This working paper presents the initial findings of a SKOPE study exploring graduate migration from Wales. The paper seeks to establish the extent to which Wales retains its graduate labour in employment; and secondly, to estimate the labour market outcomes for 'Welsh' graduates (i.e. those born in Wales) and to investigate whether and how these may change and what factors may become more significant over time. In so doing, the paper focuses on analysing the location and employment outcomes of successive 'young' graduate cohorts since the 1992 expansion of Higher Education. It does this by augmenting the widely used graduate first destinations data produced by the Higher Education Statistics Agency (HESA) with detailed analysis of Labour Force Survey (LFS) and Annual Population Survey (APS) data to provide new insights into the patterns of and returns to graduate mobility.

1. Introduction

Interest in the ability of cities and regions to retain their most highly qualified graduate labour is increasing in line with the growing understanding of the importance of human capital to local and regional economic performance. Indeed, there are strong arguments to suggest that variations in human capital lead to differences in invention, innovation and ultimately productivity in different urban and regional economies (Martin and Sunley, 1998). Internal migration in Britain is typically dominated by the young, highly educated, start-of-career or early career professionals (Champion 1999). However, as regional specialisation has shifted to one structured on occupation rather than industrial categories, so only certain regions and cities can provide the high-flier career and training opportunities these migrants seek. This “reinforces the virtuous cycle of growth of favoured regions and, in the zero-sum game geography of Britain’s regions, a vicious one of the draining away of human capital in others” (Hoare and Corver, 2010; p. 480). For example, in its survey of 56 English towns and cities in 2006, the UK government’s State of the Cities report found that all the worst performing cities in economic terms had increased the proportion of graduates in their workforces by less than the English average (Simmie et al, 2006).

Attracting and retaining graduates is thus critical to local and regional economic performance and as such, interest in the geography of graduate labour in the UK is growing. The research to date highlights a number of critical research themes. Firstly, studies indicate that the dominant effect of human capital acquisition amongst graduates is that it improves their ability to gain higher quality employment in a much broader set of locations (Faggian et al, 2007). A region’s ability to generate, retain and attract graduate workers is critically linked to the employment opportunities available relative to other locations (Kodrzycki, 2001; Bond et al, 2006; Darchen and Tremblay, 2010).

Secondly, patterns of graduate mobility are strongly connected to previous patterns of migration for education. As such, factors which shape the pathways from home to university (such as quality-of-life, amenity attractions and social aspects) are also likely to be important in shaping the available stock of graduate labour in a region (Cowling and Pollard, 2008).

Thirdly, it is increasingly evident that graduate mobility evolves over time. As Hoare and Corver (2010; p. 491) observe, “with ever more mobile labour forces, both spatially and between jobs, occupations and employers, any assumption that first destinations represent jobs and labour markets for life is clearly never less tenable than now”. Not surprisingly as graduates mature, long-term relationships and the suitability of their environment for family

formation becomes more important to them (Bond et al, 2008). This carries important implications for those 'loser' regions capable of attracting graduate returnees at a later stage in their life cycle and suggests that graduate mobility over time is likely to be influenced by the complex and perhaps competing 'pull' forces of places where graduates grew up or studied, as well as the powerful 'push' of career opportunities.

These issues are particularly pertinent in relation to Wales. The existence of a 'brain drain' of graduate labour from Wales has become a focus of recent debate not least because of the strong interconnections between Welsh and English higher education and labour markets and growing concern about the relatively poor performance of the Welsh economy. Whilst some evidence of significant human capital outflows from the region exists, a clear picture of the nature and scale of the problem and the role of available regional employment opportunities in shaping it, has not yet emerged (Drinkwater and Blackaby, 2004, cf. Fevre, 2004; Tyers et al, 2006).

The purpose of this paper is to address this gap. The aim of the paper is thus twofold: firstly, to establish the extent to which Wales retains its graduate labour in employment; and secondly, to estimate the labour market outcomes for 'Welsh' graduates (i.e. those born in Wales) and to investigate whether and how these may change and what factors may become more significant over time. In so doing, the paper focuses on analysing the location and employment outcomes of successive 'young' graduate cohorts since the 1992 expansion of Higher Education. It does this by augmenting the widely used graduate first destinations data produced by the Higher Education Statistics Agency (HESA) with detailed analysis of Labour Force Survey (LFS) and Annual Population Survey (APS) data to provide new insights into the patterns of and returns to graduate mobility.

As such, the paper contributes to the existing literature on inter-regional flows of graduates. It highlights the economic returns to graduate migration and how these are sensitive to the path dependencies and structures of regional economies, as well as to the path dependencies of mobile graduates themselves.

The paper is organised as follows. The next section provides a summary literature review of the recent debates on graduate mobility focusing particularly on the UK which has a highly uneven geography of graduate labour. Section three establishes the nature and scale of graduate mobility to and from Wales. Section four goes on to analyse the labour market outcomes for Welsh graduates. The paper then establishes some conclusions.

2. Understanding Graduate Mobility in the UK

The processes by which individuals enter higher education, and subsequently enter the labour market, have significant implications for the quantity and quality of human capital available in different cities and regions. The locational decisions of these individuals and the flows that derive from these decisions are important, not least because they “possibly represent the greatest flow of human capital around a region or country at a given point in time” (Cowling, 2009: 5). Nevertheless, until recently little has been understood about the inter-regional flows of graduates around the country, let alone how well (or badly) particular regions fare from them. A number of recent studies have however begun to illuminate some key features and determinants of the geography of graduate labour in the UK.

First and foremost, studies point to the uneven and varied employment geography of the graduate economy in the UK. London stands out as a ‘magnet’ for graduates looking to pursue lucrative business careers. For example, using Annual Population Survey (APS) data, Wright (2011) finds that most young graduates (i.e. those aged between 20 and 29) live in London and the South East. Wales, Northern Ireland and the North East each have less than 5% of the UK’s young graduates. However, the national picture is more complex as city-regions and urban centres throughout the country have evolved as local and sub-regional knowledge economies, and hence as sources of ‘intervening opportunities’ for graduates.

Thus, Cowling (2009) demonstrates how human capital (defined as the proportion of the population with at least an undergraduate degree) is concentrated in the UK’s 100 largest cities (excluding London). Furthermore, Wright (2011) demonstrates that many cities and regions across the UK have experienced a growing share of the UK’s young graduates over the past ten years. For example, Yorkshire and Humberside, the North East and the East Midlands all experienced an increase in young graduates as a proportion of their working age populations between 2001 and 2009. Many cities outside of the South East, such as Leeds, Sheffield and Rotherham, have also witnessed large increases in the number of young graduates who live there.

Wright’s analysis suggests it is increased public sector demand in the regions which appears to have driven the ‘spreading out effect’ of young graduates. Between 2000 and 2010, the percentage of young graduates working in the public sector increased faster than that of the workforce as a whole. Over the same time period, there was a decrease in the percentage of young graduates working in banking, finance and insurance (the most popular destination at

the beginning of the decade). Young graduates in regions outside of London and the South East are disproportionately employed in the public sector. For example, about 45% of Wales' young graduates work in the public sector. The decade of public sector expansion from 1997 meant that young graduates took jobs in the public sector and were freer to live in parts of the country beyond London and the South East. The implications are that public sector cuts will threaten the ability of these cities and regions to retain graduates. Moreover, this points to the differing locational tendencies of the public and private sectors. The public sector of the knowledge economy acts as a decentralising force, whilst the private sector acts to centralise degree-level job opportunities (Graduates Yorkshire, 2007; Wright, 2011).

Secondly, studies suggest that a region's ability to generate, retain and attract graduate workers is critically linked to the employment opportunities available relative to other locations. Drawing on a survey of 650 final year students at Sussex University, Cowling and Pollard (2008) conclude that over 53% of graduates end up away from their home town and tend to be attracted to cities with larger populations and a higher share of professional employment. They also find that graduates want to gain experience and qualifications in order to secure their desired long-term employment and seek employers who provide stimulating work and opportunities for training and development. Although salary is important, the reputation of the company and its location are also significant. Darchen and Tremblay's (2010) study of the work and location preferences of Canadian science graduates has similar findings. The study concluded that career opportunities are more important than factors relating to the quality of place or the 'people climate' (understood as that mix of lifestyle and amenity elements that make a region more attractive).

This is echoed by a study by Coombes et al (2003) of the preferences of graduates from Welsh higher education institutions when seeking employment. This concludes that the most important factors for graduates are job satisfaction and career development prospects. When choosing locations to search for employment, wage levels, cost-of-living and commuting distance from home were identified as important factors, with quality-of-life factors less influential. Thus whilst graduates had positive perceptions about the quality-of-life in Wales (such as access to and quality of the countryside, and the relatively low cost of living), they raised concerns about the quality of jobs and relative wage levels in their chosen fields and the lack of graduate level employment and career development opportunities available.

Thirdly, it is increasingly apparent that patterns of graduate mobility are strongly connected to previous patterns of migration for education. An individual who has moved in the past has

a considerably higher probability of moving in the future. Thus there is a critical form of 'path dependence' influencing graduate migration, as those who have moved to study are more likely subsequently to move to employment (Faggian et al, 2007; Hoare and Corver, 2010; Mosca and Wright, 2010). Indeed, the geographies of undergraduate origin, location of study and first employment are critically linked and as such, factors which shape the pathways from home to university (such as quality-of-life, amenity attractions and social aspects) are also likely to be important in shaping the available stock of graduate labour in a region (Hoare and Corver, 2010). In turn, it is possible that the factors influencing an individual's choice of Higher Education Institution versus their subsequent labour market decisions might be quite different. Indeed, Cowling and Pollard (2008) find that attractive courses and high quality teaching are the most important influences on students' university choice at undergraduate level. Quality-of-life in the host city and the 'feel' of the university is also important (what they term 'the Brighton factor'). Criteria for selecting a university vary according to students' academic level and social background however. Undergraduates are more concerned with social aspects of a university and city. Post-graduates and ethnic minority students look for research and teaching quality, and employment prospects.

This important distinction between migration for education and migration for subsequent employment is captured in Hoare and Corver's (2010) 'HULT' model of Home-University-Labour Transitions, which conceptualises the different movements of students and graduates. This model usefully describes how each regional labour market has four separate pathways from which they can recruit graduates: the 'locals' pathways (students who study in their home region); the 'returners' pathways (students who study elsewhere and return home for employment); the 'stayers' pathway (students who remain in a region after moving there to study); and the 'outsiders' pathway (students who move away from their region of home and study experience). The study applies this model to graduate mobility across UK regions and finds that there is a consistent geographical structure over all four cohorts studied. Almost all regions consistently show greater rates of recruiting students with prior familiarity through home or study, and particularly both, although this does not necessarily mean that the locals pathway is the most important one for absolute graduate recruitment. In many of these analyses London is the glaring exception. It is the overwhelming 'winner' region in the competition to be the first destination of young graduates. It enjoys high conversion rates across the pathways and is the only region to depend most on the 'outsiders' pathway for its graduate recruitment.

Other studies support Hoare and Corver's (2010) finding of a degree of 'stickiness' in graduate mobility and assert that the first destinations of students and graduates are critical

to shaping their subsequent locational decisions. For example, Faggian et al (2007) find that the acquisition of job-specific and region-specific human capital engenders 'lock-in' effects (David, 1985) which tend to be localised both occupationally and regionally. This suggests that often individuals will tend to remain in the same region and in the same broad occupational groupings over a lifetime of working. Indeed, less than 1% of the UK working population actually undertake inter-regional migration per annum and, even for unemployed workers, this figure is less than 2 per cent (McCormick, 1997). Thus, the vast majority of workers tend to remain in the same UK region and the same broad occupational groupings for very long periods. Faggian et al (2007) assume that graduates are aware of this general hysteresis effect, in that accepting employment in an area significantly increases the likelihood that they will actually continue to work both in that occupation and in that same particular area for a large part of their career.

However, there is increasing evidence to suggest that graduate mobility changes and evolves over time. As Hoare and Corver (2010; p.491) observe, "with ever more mobile labour forces, both spatially and between jobs, occupations and employers, any assumption that first destinations represent jobs and labour markets for life is clearly never less tenable than now". Not surprisingly as graduates mature, long-term relationships and the suitability of their environment for family formation becomes more important to them (Bond et al, 2008).

Different graduates also have different propensities to migrate. Mosca and Wright (2010) find that migration is a selective process with graduates with certain characteristics having considerably higher probabilities of migrating to other regions of the UK (and abroad). Characteristics that appear to be important include class of degree, subject studied, type of institution attended and age at graduation. Faggian, Li and Wright (2008) similarly observe that in Scotland, the most mobile graduates are typically of the highest quality (see also Faggian et al, 2007). In a similar study, Faggian, Corcoran and McCann (2008) have found that more selective universities (i.e. the Russell or 1994 group) tend to produce more 'focused' out-migration movement. Mature graduates and those with a higher human capital (a 2:1 or first class honours degree) tend to move further, but are more 'focused' in these movements. Female and black students tend to search in different directions (more locally), whilst students studying Education, Maths and Engineering tend to be associated with a greater spread of movements.

3. Data: Graduate Migration in Wales

This section of the paper seeks to establish the patterns of graduate migration to and from Wales. The analysis is based upon data from the UK LFS for the period 2006 to 2010 augmented by HESA and APS data. The LFS is the largest regular survey of households conducted in the UK, with individuals in some 60 thousand households being interviewed each quarter. The LFS asks a range of questions about the personal, household and labour market characteristics of respondents, which can help to provide a picture of the careers of graduates.

The focus of the analysis is upon the characteristics of young graduates who completed their studies since 1992. Whilst expansion in the numbers of people participating in Higher Education has increased steadily over several decades, 1992 represents a watershed in terms of participation in higher education, with many former polytechnics gaining 'new' university status. The period since 1992 exhibited a large increase in the numbers of people participating in university and the growth is likely to have affected the opportunities of graduates.

We also focus upon the careers of 'young' graduates who are defined as those who were aged 25 or below at the time of their graduation. The LFS does not contain any information regarding mode of study (i.e. full time or part time). However, the LFS does ask those respondents with a degree or higher degree the year/age at which they completed their studies. It is assumed that the age 25 cut off represents the point where individuals who obtain a degree are most likely to have participated in higher education on a full time basis, following on from their completion of further education. Given the focus upon graduate migration, the analysis abstracts from issues surrounding the participation of older people in higher education, who will have possibly different motivations for undertaking further study and who will also be more restricted in their career choices following graduation. Finally, given the interest in the circumstances of graduates following migration, the analysis is further restricted to those people who regard themselves as no longer being in full time education.

The analysis is augmented with analysis of APS data from January 2008 until September 2010. Crucially, the APS includes a question on (UK) country where the respondent's highest degree was obtained, thus augmenting LFS data by providing a geographical fix on region of study as well as of birth and of residence. This question was first included in January 2008. The analysis below comprises APS combined data for the calendar years

2008 and 2009, along with the most recent data (up to September 2010) for graduates of working age in the UK.

3.1 UK Migrants and Possession of a Degree

The LFS asks respondents about the country in which they were born and their current region of residence, enabling respondents who are no longer living in their country of birth to be identified. The analysis is restricted to those respondents who were born in the UK.

Table 1 shows the overall strong relationship between being a graduate and a higher incidence of mobility, with 35% of those who have migrated from the region of their birth being in possession of a degree, compared to 18% of those living in their region of birth. It also shows broad differences between constituent parts of the UK. Considering Wales, 15% of those under the age of 45 who were both born and live in Wales possess a degree or higher degree, compared to 43% of Welsh migrants living elsewhere in the UK. This 28 percentage point difference between Wales' degree holding non-migrants and migrants contrasts to a 12 percentage point difference for England, a 19 point difference for Scotland, and is only surpassed by Northern Ireland's 31 percentage point difference. This indicates that there are distinct set of issues about graduate migration worth exploring for Wales.

Table 1: Non-Student Population under 45 in Possession of a Degree/Higher Degree (%)

Region of Birth	Non-Migrants	Migrants	Total
England	18.6	30.8	18.9
Wales	14.6	42.6	19.4
Scotland	15.4	33.7	17.9
N Ireland	17.4	48.4	20.3
Total	18.1	35.3	18.9

Source: Labour Force Survey 2006-2010

Table 1 refers to the non-student population under the age of 45. We focus on this age group as that which has been most affected by the expansion of Higher Education participation in the UK since 1992. A 'young graduate' (defined as under age 26 at the time of graduation) could be aged 44 at the time of their LFS interview if they are included in the 2010 LFS data. It is however acknowledged that a relatively small number of post 1992 graduates are aged 44 within the 2010 LFS.

3.2 Wales as a net exporter of graduates

Table 2 shows the general pattern of migration within the UK among the working age population (i.e. not just those under age 45) who are not in full time education. It can be seen that approximately one-fifth of those originally born in Wales are living elsewhere in the United Kingdom. Just under a third of this group are living in London and the South East, subsequently referred to as the Inner Region Core (IRC), with just under two-thirds living elsewhere in England. Wales exhibits a higher rate of outward migration among the non-student working age population (21%) compared to both Scotland (17%) and Northern Ireland (11%).

Table 2: UK Migration (UK Born, Working Age Population)

Region of Birth	Region of Residence					Total	Migration Incidence
	IRC	ROE	Wales	Scotland	N Ireland		
England	30.9	66.2	1.5	1.2	0.2	100	2.9%
Wales	6.6	12.8	79.5	0.8	0.2	100	20.5%
Scotland	5.5	10.6	0.5	83.0	0.4	100	17.0%
N Ireland	3.5	5.7	0.3	1.6	88.8	100	11.2%
Total	26.1	55.5	5.1	9.1	4.2	100	5.5%

Source: Labour Force Survey 2006-2010

Table 3 considers the proportion of respondents to the LFS who report that they possess a degree. Those among the working age population identified as migrants are more likely to hold a degree or higher degree (29%) than those who do not (16%). Among the non-student population of working age, those who were born and live in Wales are least likely in the UK to possess a degree (13%), although this figure is similar to that observed among those who were born and remain in Scotland (14%) and those who were born and remain in Northern Ireland (15%). Forty-four percent of those who were born in Wales but who have subsequently moved to the IRC possess either a degree or higher degree, more than three times the rate observed among those born in Wales and who are living in Wales at the time of the LFS interview.

Comparing Table 3 to Table 1 also illustrates that levels of educational attainment as measured by the possession of a degree or higher degree are higher among the younger (below 45) age group than the working age population as a whole. This is particularly the case among those people who no longer live in the region they were born. For Wales, 15% of those under the age of 45 who were both born and live in Wales possess a degree or higher degree, 2 percentage points higher than that observed among the working age population as a whole. However, 43% of Welsh migrants under the age of 45 at the time of

the survey report that they possess a degree, some 8 percentage points higher than the working age population as a whole.

Table 3: Internal Migrants in Possession of a Degree/Higher Degree (%) (UK Born, Working Age Population)

Region of Birth	Region of Residence					Migrant Summary		
	IRC	ROE	Wales	Scotland	N Ireland	Non-Migrants	Migrants	Total
England	21.2	14.6	24.3	31.4	23.8	16.7	27.2	17.0
Wales	44.4	30.5	12.7	36.9		12.7	35.0	17.3
Scotland	35.9	22.0	24.6	13.7	21.5	13.7	26.5	15.9
N Ireland	37.6	32.6	24.6	50.0	15.0	15.0	36.5	17.4
Total	21.8	15.0	15.7	16.0	15.4	16.2	29.3	16.9

Source: Labour Force Survey 2006-2010

APS data enable consideration of the distribution of graduates amongst the resident working age population in the UK's regions, according to where they obtained their highest degree. Table 4 shows that the vast majority of the working age population of the different regions obtained their highest degree in that region. However, the 54% of working age graduates living in Wales who obtained their highest degree in Wales is significantly lower than the 75% rate for Northern Ireland and 80% for Scotland. A high proportion (41%) of those working age graduates who gained their highest degree in Wales reside in England.

Table 4: Country of Highest Degree by Constituent Part of the UK (%), Working Age Population

Region of residence	Region of Highest Degree				N
	England	Wales	Scotland	N. Ireland	
England	87.4	40.6	15.2	12.4	44,446
Wales	2.5	54.2	1.0	0.4	4,145
Scotland	2.4	1.3	79.6	4.7	7,722
N Ireland	0.3	0.2	0.5	75.1	1,217
Other (not UK)	7.4	3.8	3.7	7.4	4,031
<i>Number of observations</i>	46,734	5,365	8,104	1,358	61,561

Source: Annual Population Survey, 2008-2010

Analysis of the HESA data affirms that Wales is a 'loser region' generating more undergraduates than it recruits recent graduates into employment. Moreover, Wales 'loses' potential graduate recruits both at the stages of home to university and university to labour transitions (Hoare and Corver, 2010; Mosca and Wright, 2010). Turning first to home to university flows, Mosca and Wright (2010) find that although the majority of undergraduates (on degree and non-degree courses) stay in their country of domicile to study, there is a

considerable amount of movement, particularly so for Wales-domiciled students, 34% of whom studied in England.

Table 5: Country of domicile by country of study for undergraduate students (including non-degree) (%), 2002/03-2006/07

Country of domicile	Country of study			
	Wales	England	Scotland	N Ireland
Wales	65.9	33.5	0.6	<0.1
England	3.2	95.4	1.4	0.02
Scotland	0.2	6.8	93.0	<0.1
N Ireland	0.6	13.9	9.6	75.9

Number of observations = 1,159,324

Source: Mosca and Wright (2010), using HESA 'Students in Higher Education' 2002/03-2006/07.

When considering first degree students only, Wales' low retention rate of home students compared to England and Scotland remains pronounced, as illustrated by Table 6 which shows that 30% of Wales-domiciled undergraduates study in England. In terms of absolute flows of students, the high base of English-domiciled students means that despite only 3% of this group coming to Wales to study, the 25,220 students this entails equates to nearly three-quarters of the number of Wales-domiciled students staying in Wales to study (at 34,950), or 42% of all full-time first degree students studying in Wales (at 60,620). The outflow of Wales-domiciled students to study in England (15,170) is roughly a third less than the inflow of English-domiciled students (25,220) coming to Wales to study. These findings support Rees and Taylor's (2006) observation that 'it makes more sense to think in terms of an integrated "England and Wales" [higher education] system'.

Table 6: Country of domicile by country of study for full-time first degree students (% & number), 2009/10

Country of domicile	Country of study (% and nos)								Total Students
	Wales		England		Scotland		N Ireland		
Wales	69.1	34,950	30.0	15,170	0.8	405	0.0	20	<i>50,545</i>
England	2.9	25,220	95.3	818,245	1.7	14,815	0.0	410	<i>858,690</i>
Scotland	0.1	140	5.0	4,775	94.8	89,680	0.0	40	<i>94,635</i>
N Ireland	0.8	310	19.9	8,065	9.7	3,930	69.6	28,200	<i>40,505</i>
<i>Total Students</i>		60,620		846,255		108,830		28,670	<i>1,044,375</i>

Source: Adapted from HESA 'Students in Higher Education' 2009/10, table 7b.

However, though Wales has a lower retention rate than other parts of the UK, a significantly higher proportion of Welsh residents remain in Wales for higher education than is average across the English regions. For example, for 2009/10, the Welsh retention rate was 22

percentage points higher than the English regional average, equating most closely with the rates for the North East and North West of England (see Table 7).

Table 7: Region of Domicile Retention Rate for full-time first degree graduates, 2009/10

English Region	Retention Rate %
North East	61.0
North West	61.3
Yorkshire & The Humber	53.8
East Midlands	42.2
West Midlands	46.5
East of England	28.0
London	55.0
South East	37.6
South West	41.8
English region average	47.5
[Wales]	69.1

Source: Adapted from HESA 'Students in Higher Education' 2009/10, table 7b.

Turning now to university to first employment flows, Wales is also a 'loser region' in terms of (full-time first degree) graduates entering employment, with a net flow of graduates out of Wales (Hoare and Corver, 2010). Wales' retention rate of graduates is also lower than the other home nations (Table 8).

Table 8: Country of study by country of employment six months after graduation: for employed undergraduate graduates (including non-degree) (%), 2002/03-2006/07

Country of study	Country of employment			
	Wales	England	Scotland	N Ireland
Wales	61.3	35.7	0.4	0.2
England	1.2	95.7	0.6	0.3
Scotland	0.3	11.5	83.5	1.5
N Ireland	0.1	3.4	0.8	91.8

Number of observations = 837,279.

Source: Mosca and Wright (2010), using HESA 'Destinations of Leavers from Higher Education' (DLHE) 2002/03-2006/07.

In terms of absolute flows, five years of HESA data up until 2008/09 show that for full-time undergraduates (on degree and non-degree courses) entering employment there has been a net flow of graduates out of Wales. For example, in 2008/09, 615 more 'Welsh' graduates (i.e. graduates of Welsh HEIs) were employed outside Wales than other UK graduates were employed in Wales (Table 9).

Table 9: Summary flows to and from Wales (within UK) of full-time undergraduate students (including non-degree) entering employment, 2004/05-2008/09

	2004/05	2005/06	2006/07	2007/08	2008/09
'Welsh' graduates in Wales	4,430	4,030	4,225	4,485	4,690
'Welsh' graduates outside Wales	-1,685	-1,695	-1,660	-1,765	-1,715
'Non-Welsh' graduates in Wales	1,305	1,125	1,260	1,165	1,100
Net flow of graduates	-385	-570	-395	-600	-615

Source: WAG Statistical Bulletin, SB 78/2010, using HESA 'Destinations of Leavers from Higher Education' (DLHE) data

However, while this confirms notions of a 'brain drain' from Wales, particularly as the Welsh retention rate is significantly lower than that of the other constituent nations of the UK, when compared to the English regions, Wales does retain a sizeable proportion of its graduates (Table 10), only surpassed by London and the North West.

Table 10: UK Distribution of employed undergraduate graduates (including non-degree) six months after graduation (%), 2002/03 – 2006/07 *

Region of Study	Region of Employment 6 months after graduation			
	Stayed	London	Rest of England	Rest of UK
Wales	62.3	4.4	30.2	0.6
England	93.5			2.1
N Ireland	92.9	0.4	1.7	0.9
Scotland	83.7	3.9	7	1.8
<i>English Region</i>				
South East	41.8	25.7	28.1	1.9
East Midlands	42.9	11.2	41.9	1.7
West Midlands	52.5	11.9	31.4	2.2
Yorks & Humber	54.7	7.8	33.1	1.5
South West	55.2	13.9	23.8	3.7
East	58.9	17.9	19	1.3
North East	59.9	8.9	25.3	3
North West	68.1	5.8	20.4	3.5
London	71.3		25.6	0.9

Number of observations = 812,433

* It is recognised that response biases are likely to exist in terms of response rates, with variance across groups of graduates. For example, Hoare and Corver (2010) posit a likely response bias between those in 'proper' graduate occupations and those in more temporary jobs.

Source: Mosca and Wright (2010), using HESA 'Destinations of Leavers from Higher Education' (DLHE) 2002/03-2006/07.

3.3 The nature of graduate migrants

It is important to consider who is most likely to leave Wales for employment after attending a Welsh higher education institution. This is particularly pertinent given the large inflow of English students to study in Wales. Through their HULT model, Hoare and Corver (2010) find that Wales is one of only four of the 12 regions (along with Scotland, Northern Ireland and the North East) which draws its largest single volume of graduate recruits from the ‘locals’ pathway. This is borne out by analysis of HESA data conducted using these ‘pathways’ on a more recent cohort (2005/06) of graduates in (full-time, paid) employment. This confirms ‘locals’ as the most significant source of graduate labour recruitment for Wales (at 60% of the total employed graduates), compared to ‘stayers’ (at 13%). Therefore, non-Welsh domiciled students who come to study in Wales are more likely to leave for employment (Table 11).

Table 11: Graduates from 2005/6 who were working six months after graduation, by region and location of domicile and study (Nos & % of total employed in region)

UK region	Locals		Returners		Stayers		Outsiders		Total employed
Wales	3,820	60	1,205	19	840	13	485	8	6,350
England	48,655	42	31,420	27	16,050	14	20,790	18	116,905
Scotland	10,835	84	655	5	935	7	490	4	12,920
N Ireland	3,830	83	685	15	15	0	70	2	4,600

Source: ‘Graduate Mobility: who goes to work in each region’ (2008) prepared by HECSU for Prospects.ac.uk, using HESA ‘Destinations of Leavers from Higher Education’ (DLHE) 2005/06.

What about those who leave Wales to study? The notion of their return at a later stage – often equated with family formation - is evident anecdotally, but there are significant challenges in finding statistical evidence of sufficient longitude to support this. However, research using HESA data does indicate the ‘pull of home’ exerted on graduates who have studied elsewhere. Hoare and Corver (2010) compared the conversion rates between their ‘returners’ and ‘stayers’, and found that of the two labour recruitment ‘pulls’ exercised by any region – that of being at home and that of studying there – being at home is much more powerful. This is confirmed by the analysis of more recent data in Table 11 above, which highlights the relative importance of those returning to the region of domicile to work after studying elsewhere, with ‘returners’ comprising 19% of total employed graduates for Wales six months after graduation in the 2005/06 cohort.

While APS data cannot be used to establish exactly when graduates migrate, it does indicate the age-related nature of migration. Table 12 sets out Wales’ resident graduate

working age population according to where they obtained their highest degree by broad age group. Here age differences are evident, particularly when comparing relatively young graduates with older age categories. Nearly 70% of graduates aged under 30 living in Wales received their highest degree from a Welsh university, but this declines by 15 percentage points to 53% in the 30-39 age group (contrasting with a 7 percentage point equivalent shift for Scotland). This is likely to reflect internal migration decisions, with those with Welsh degrees moving to England, but also Welsh-born graduates who studied and worked in England for the early part of their careers returning for family formation. In fact, the proportion with degrees from English and Welsh institutions is almost the same amongst the oldest, 50-64, age group.

Table 12: Region of Highest Degree for Welsh Working Age Population (%) by Age

	Under 30	30-39	40-49	50-64
England	28.2	39.3	43.4	47.8
Wales	68.2	53.0	51.5	48.1
Scotland & N Ireland	0.8	1.6	1.7	1.8
<i>Number of observations</i>	<i>1,014</i>	<i>1,518</i>	<i>1,388</i>	<i>1,445</i>

Source: Annual Population Survey, 2008-2010

3.4 Degree Subject

Prior to investigating labour market outcomes for Welsh graduates, it is useful to consider information on subject studied, set out in Table 13. No specific pattern emerges. Among Welsh graduates, those who remain living in Wales are more likely to have studied a vocationally orientated degree such as medicine, education or law. However, this group are less likely to have studied SET (science, engineering, technology) related subjects (a differential of 9 percentage points). The bottom panel of Table 13 shows the proportion of graduates who graduated with degrees in STEM subjects (science, technology, engineering and maths). Across all regions of the UK, migrant graduates are more likely to possess degrees in STEM subject areas (a differential of 6 percentage points). This differential is 7 percentage points for Wales, in contrast to 4 points for Scotland. This has potential implications for Welsh HE and economic development policies.

Table 13: Post 1992 Young Graduates Degree Subject (%)

	Non-Migrants	Migrants	All	Differential
England				
Medical, education & vocational	20.3	24.3	20.4	4.03
SET	31.7	34.8	31.8	3.07
Social Sciences	23.3	17.2	23.1	-6.07
Arts, Humanities	24.8	23.7	24.7	-1.03
Wales				
Medical, education & vocational	27.8	19.7	25.1	-8.1
SET	25.9	35.4	29.1	9.4
Social Sciences	20.7	19.5	20.3	-1.1
Arts, Humanities	25.6	25.4	25.5	-0.2
Scotland				
Medical, education & vocational	24.4	20.0	23.4	-4.3
SET	31.8	36.0	32.8	4.2
Social Sciences	27.0	23.4	26.1	-3.6
Arts, Humanities	16.9	20.6	17.7	3.7
Northern Ireland				
Medical, education & vocational	26.9	25.5	26.6	-1.4
SET	29.9	31.8	30.4	1.9
Social Sciences	30.0	23.4	28.4	-6.6
Arts, Humanities	13.2	19.3	14.6	6.1
STEM Summary				
England	38.5	45.7	38.8	7.2
Wales	35.4	42.8	37.9	7.4
Scotland	41.1	44.9	42.0	3.8
Northern Ireland	42.6	44.4	43.0	1.8
Total	38.7	44.7	39.2	6.0

Source: Labour Force Survey 2006-2010

The APS data enables consideration of the region in which graduates gained their highest degree. Table 14 sets out Welsh-born working age graduates living in the UK according to the region where they gained their highest degree and where they currently live by type of degree and degree subject.

Table 14: Region of Highest Degree and Residence for Welsh-Born Graduates (%), by Type of Degree and Degree Subject

	Type of Highest Degree				Subject of Degree	
	Higher	First	Foundation	Other	STEM	Non-STEM
Welsh degree, lives in Wales	50.6	52.7	71.2	54.6	49.2	56.5
English degree, lives in Wales	19.3	24.5	12.1	15.9	23.5	21.9
Other degree, lives in Wales	0.8	0.5	0	2.3	0.4	0.5
Welsh degree, lives in England	4.4	4.6	1.5	4.6	5.1	3.7
English degree, lives in England	21	16.2	12.1	20.5	18.6	15.7
Other degree, lives in Other UK	3.9	1.5	3	2.3	3.3	1.8
<i>Number of observations</i>	<i>1,189</i>	<i>2,595</i>	<i>66</i>	<i>44</i>	<i>1,321</i>	<i>1,986</i>

Source: Annual Population Survey, 2008-2010

The Welsh-born with higher degrees are least likely to have both obtained highest degrees from and live in Wales, whilst those with Foundation degrees are most likely. For the Welsh born, however, a higher percentage of those with post-graduate degrees obtained their degree from an English institution and continue to live there. In contrast, it appears that a higher proportion of undergraduates return to Wales.

There are quite large differences for Welsh-born graduates with degrees from STEM or non-STEM subjects, whereas the differences between Scottish-born graduates are very small. Less than half of Welsh-born STEM graduates obtained their highest degree and have remained in Wales, with the percentage of non-STEM graduates in this category being more than 7 percentage points higher.

4. Graduates at Work – Employment Outcomes and the Evolution of Graduate Careers

It is possible to use repeated cross sections of the Labour Force Survey to consider the evolution of graduate careers. For the purpose of this analysis, we first identify all young graduates (those aged 25 or below at the time of graduation) within the Labour Force Survey between 2006 and 2010 who had graduated within the last 5 years. The LFS is a cross-sectional survey and so these graduates are not the same individuals being followed up over time. It is also noted that these graduates could have left university at any time between 2001 (if they appear in the 2006 LFS and report that they had completed their studies 5 years earlier) or 2010 (if they are a recent graduate who has been included in our last year

of data). Due to the small sample sizes associated with this analysis, we combine data together on graduates who were born in Wales, Scotland and Northern Ireland. English graduates are excluded from the analysis - it is only possible to identify an English migrant if they move to one of the other home countries. Many English non-migrants may have moved from their region of birth in order to find work elsewhere in England. The inability to distinguish this group may therefore contribute to an inaccurate picture of non-migrants within England.

Table 15: The Evolution of Graduate Careers Among Recent Graduates Born in Devolved Regions

Years following graduation	Non-Migrant			Migrants	All	Differential
	Living elsewhere	Living with parents	All			
<i>In employment (%)</i>						
0	71.2	63.5	65.5	63.4	65.2	-2.1
1	83.8	69.7	74.5	83.9	76.5	9.4
2	92.6	81.2	86.6	87.4	86.8	0.8
3	92.3	84.3	89.3	89.9	89.4	0.7
4	92.3	87.5	90.8	88.8	90.3	-2.0
5	96.2	89.8	94.5	94.1	94.4	-0.4
<i>In Non Graduate Employment (%)</i>						
0	52.1	61.7	59.0	46.2	57.2	-12.8
1	38.6	53.3	47.7	30.5	43.7	-17.1
2	26.9	46.6	36.6	26.0	34.4	-10.6
3	25.9	47.1	33.5	17.3	30.1	-16.2
4	22.0	37.1	26.6	12.7	23.3	-14.0
5	25.2	37.1	28.2	15.6	25.1	-12.6
<i>Gross Weekly Earnings (£)</i>						
0	279.70	237.06	248.47	374.27	267.15	125.80
1	335.65	275.31	304.72	373.91	322.34	69.19
2	378.90	291.25	343.21	420.36	363.02	77.15
3	412.36	324.43	388.03	482.81	410.00	94.79
4	429.13	387.87	419.96	514.66	446.90	94.70
5	466.30	372.70	450.25	589.96	489.35	139.70

Source: Labour Force Survey 2006-2010

It can be seen from Table 15 that there is a period of assimilation into paid work, with the proportion of graduates who are in work increasing during the 5 or so years following graduation. The rate of assimilation into paid work appears to be relatively slow among young graduates who are based in their region of birth and live in the parental home. Over time, the proportion of young graduates employed in non-graduate occupations declines. 'Non-graduate' jobs is part of the classification of graduate occupations developed by Elias and Purcell (2005) and is defined as a job where the skills, knowledge and experience associated with the competent performance of work tasks is less than that which would be expected to be held by a person who had successfully completed a degree. A majority of

graduates in devolved regions initially find employment in non-graduate occupations (57%). The proportion of graduates employed in such occupations gradually declines as they find employment in jobs more suited to their skills. Five years after graduation, some 25% of employed graduates remain in non-graduate jobs. Throughout this five year period, the share of employment in non-graduate occupations among employed young graduates is consistently high among those who live in their region of birth and is highest among those who live in the parental home. The rate of decline in the share of employment within non-graduate occupations is also relatively slow among this group of non-migrant graduates. Finally, in terms of the evolution of weekly earnings, earnings differentials between migrant and non-migrant graduates from devolved regions are particularly high during the first 12 months following graduation. This could simply be the result of small sample sizes or possibly due to the relatively poor quality jobs held by graduates who remain in their region of birth immediately following graduation. Abstracting from their first year in the labour market, the earnings differential between migrating and non-migrating graduates from devolved regions appears to widen over time. Once again, earnings are lowest among those living in the parental home.

Table 16: The Evolution of Graduate Careers Among Post 1992 Young Graduates Born in Devolved Regions

	Non-Migrants			Migrants	All	Differential
	Living elsewhere	Living with parents	All			
Non Graduate Employment (%)						
0-4 years	28.3	49.5	38.3	22.9	35.0	-15.4
5-9 years	20.0	38.7	22.9	13.1	20.4	-9.8
10-14 years	14.3	35.8	14.7	10.5	13.4	-4.2
15 years+	16.7	33.3	17.3	9.7	15.1	-7.6
Gross Weekly Earnings (£)						
0-4 years	390	293	351	445	374	94
5-9 years	513	389	501	638	539	137
10-14 years	589	394	583	764	640	181
15 years+	651	379	647	820	701	173
Self Employment (%)						
0-4 years	4.4	4.7	4.6	3.6	4.4	-1.0
5-9 years	4.6	2.4	4.3	5.0	4.4	0.7
10-14 years	9.3	1.3	8.9	12.5	10.0	3.6
15 years+	12.6	0.0	12.2	15.3	13.1	3.1

Source: Labour Force Survey 2006-2010

Table 16 considers the evolution of the careers of young graduates over a longer time period. Here the sample is expanded to consider the circumstances of all young (graduated at age 25 or below) post 1992 graduates. It is therefore particularly important to remember

that graduates included in these analyses left university at very different times. Within our sample, someone who had graduated more than 15 years ago must have done so in the early to mid 1990s. We focus on graduates who were born in Wales, Scotland and Northern Ireland. Considering data over this longer period, differences in the proportion of migrating and non-migrating graduates employed in non-graduate occupations appears to narrow over time. Whilst employment in non-graduate occupations remains high among those graduates who live with their parents, it must be noted that the number of graduates who live with their parents some ten years after graduation is relatively small. However, earnings differentials between migrating and non-migrating graduates in absolute terms do not appear to narrow with time, as may be expected if migrating graduates have placed their careers on a different trajectory in terms of their age/ earnings profile. Given the longer time scale, it is also now possible to consider the evolution of self-employment among young graduates. It can be seen that the incidence of self-employment increases with time elapsed since graduation. However, it is only after ten years following graduation that the incidence of self-employment reaches 10%. Self-employment is low among graduates living in the parental home and declines over time as this group gets smaller and increasingly un-representative of the wider graduate population.

Table 17 compares labour market outcomes for the devolved nations. The differential in the proportion of graduates who remain employed in non-graduate occupations following graduation declines among both Welsh and Scottish graduates, although the rate of decline appears slower in Wales. Among Northern Irish graduates, those who leave Northern Ireland exhibit particularly low levels of employment in non-graduate occupations, particularly among those who graduated more than 10 years ago. Finally, the relative difference in earnings between graduate migrants and non-migrants continues to widen in Wales and Scotland with time elapsed since graduation. Among those who graduated more than 10 years ago, the penalty in pay for home based graduates is 43% in Wales, compared to 33% in Scotland. In contrast, among Northern Ireland graduates the differential in earnings between migrants and non-migrants actually narrows among those who graduated more than 10 years ago (a differential of 20%). This is consistent with the low incidence of employment among non-graduate occupations within this group.

Table 17: The Evolution of Graduate Careers Among Post 1992 Young Graduates: Comparing Devolved Nations

	Wales				Scotland				Northern Ireland			
	Living in Region of Birth	Living Elsewhere	All	Differential	Living in Region of Birth	Living Elsewhere	All	Differential	Living in Region of Birth	Living Elsewhere	All	Differential
<i>Dependent children – excluding graduates living in the parental home (%)</i>												
0-4 years	11.2	4.1	8.1	-7.1	7.4	4.8	6.8	-2.6	15.0	0.0	9.6	-15.0
5-9 years	28.8	20.3	25.8	-8.6	25.9	21.9	24.9	-4.0	37.0	21.9	33.3	-15.2
10 years+	67.6	53.7	61.6	-13.9	57.2	49.4	55.0	-7.9	63.0	59.2	62.1	-3.8
<i>Single (%)</i>												
0-4 years	59.5	52.3	57.2	-7.1	72.6	60.9	70.7	-11.7	78.1	58.5	74.7	-19.5
5-9 years	37.7	24.1	33.3	-13.7	37.0	31.8	35.8	-5.3	40.7	30.8	38.7	-9.9
10 years+	18.7	18.7	18.7	0.0	20.8	17.4	19.8	-3.4	25.2	20.5	24.1	-4.7
<i>In non-graduate employment (%)</i>												
0-4 years	40.0	25.1	35.3	-14.9	39.2	19.7	35.9	-19.5	35.2	23.7	33.0	-11.5
5-9 years	23.1	11.5	19.2	-11.6	18.3	12.5	16.9	-5.8	29.4	16.6	26.9	-12.8
10 years+	15.5	12.4	14.2	-3.1	15.6	11.9	14.6	-3.7	15.0	3.6	12.4	-11.4
<i>Gross weekly earnings (£)</i>												
0-4 years	332.35	438.75	366.90	106.40	355.24	442.40	370.11	87.15	366.09	457.88	395.22	91.79
5-9 years	481.08	626.14	529.57	145.06	525.81	655.40	558.74	129.59	470.08	619.87	508.89	149.79
10 years+	513.86	735.79	608.28	221.93	614.08	815.62	669.43	201.54	582.15	701.76	614.54	119.61

Source: Labour Force Survey 2006-2010

In terms of their outcomes, graduates who no longer live in Wales are less likely to be employed in a non-graduate occupation, are less likely to be employed within the public sector, have higher gross weekly earnings and are more likely to be self-employed. These findings relate to the lower levels of earnings and the higher incidence of employment among graduates generally within non-graduate jobs within Wales.

Differences in personal characteristics (such as family status and educational attainment) will be important factors in determining subsequent labour market outcomes. Some of the characteristics of migrating graduates may be expected to contribute to improved labour market outcomes, such as their higher levels of educational attainment. Some of the characteristics of graduates who remain in their country of birth would be expected to contribute to poorer labour market outcomes, such as high levels of family formation, which may particularly affect the careers of women. It is therefore of interest to consider what is the separate and additional effect of migration upon the subsequent careers of graduates. To consider this issue, we utilise multivariate statistical techniques to estimate, after controlling for other personal characteristics, the effect of migration on two labour market outcomes: 1) the likelihood of being employed in a non-graduate occupation; and 2) gross weekly earnings.

For each devolved nation, the analysis was restricted to post 1992 graduates who had graduated by the age of 25. The analysis was conducted in two stages for each of the devolved countries of the UK. During the first stage, the effect of being a migrant graduate relative to being a non-migrant graduate upon both of the labour market outcomes is estimated. As a dichotomous dependent variable (i.e. 0/1), the probability of being in a non-graduate job is estimated using logistic regression. The analysis of relative gross weekly earnings (the logarithmic transformation thereof) is estimated using standard OLS techniques. During this stage, separate models were estimated for males and females. The second stage of the analysis refines the distinction made between migrant and non-migrant graduates by utilising the threefold classification which distinguishes between non-migrants who live in the parental home and non-migrants who have moved out of the parental home but who remain in the region of birth. In each stage of the analysis, statistical models contained control variables for age, ethnicity, degree class, educational attainment at GCSE level (or equivalent), parental status, family status and subject studied. We did not introduce control variables for the types and quality of jobs held by graduates, as this would be 'controlling away' many of the characteristics of jobs in devolved nations (low paying sectors, reliance on the public sector, part time work etc) which themselves contribute to the different labour market outcomes of those who remain in their country of birth versus those who

leave. Selected results from the statistical analysis are presented in Table 18. Statistically significant results (at the 5% significance levels) are highlighted in bold.

Table 18: Estimated association between graduate migration and labour market outcomes

	Relative Probability of Being in a Non-Graduate job	Relative Gross Weekly Earnings
Wales		
<i>Stage 1: Overall Differential</i>		
Male Migrants	-37.4%	28.4%
Female Migrants	-51.4%	20.3%
<i>Stage 2: Distinguishing Parental Home</i>		
Living in parental home	275.9%	-23.6%
Non migrant (reference)		
Migrant	-31.1%	21.9%
Scotland		
<i>Stage 1: Overall Differential</i>		
Male Migrants	-46.5%	15.9%
Female Migrants	-41.1%	15.6%
<i>Stage 2: Distinguishing Parental Home</i>		
Living in parental home	144.6%	-24.0%
Non migrant (reference)		
Migrant	-33.6%	13.3%
Northern Ireland		
<i>Stage 1: Overall Differential</i>		
Male Migrants	-44.5%	15.2%
Female Migrants	-65.1%	22.6%
<i>Stage 2: Distinguishing Parental Home</i>		
Living in parental home	52.0%	-24.0%
Non migrant (reference)		
Migrant	-50.6%	13.9%

Italicised= not statistically significant

Results from the analysis are relatively uniform across countries. The first stage of analysis reveals that those who migrate from their country of birth are about 50% less likely to be employed in a non-graduate job at the time of the LFS interview compared to those graduates who remain in their country of birth. Within Wales and Northern Ireland, the effect is larger for women than men, although additional tests reveal that these differentials are not statistically different from each other. In terms of gross weekly earnings, graduate who migrate earn between 15% and 20% more than those who remain in their country of birth. The effect is estimated to be largest among Welsh males, where the earnings differential is estimated to be 28%. Even within a multivariate framework, the interpretation of these results is not clear. Many of those moving from devolved regions migrate towards London

and the South East so these earnings differentials may simply reflect that component of wages paid by employers to compensate employees for the costs associated with working in a relatively expensive part of the country.

Results from the second stage of the analysis confirm that graduates living within the parental home are most likely to be employed in non-graduate jobs. This is particularly evident in Wales, where those living in the parental home are almost 300% more likely (or almost 4 times as likely) to be employed in a non-graduate job compared to non-migrants who have moved out of parental home. A large differential also exists within Scotland (150% more likely). Interestingly, the effect of living in the parental home upon the probability of being employed in a non-graduate job is lowest in Northern Ireland where no statistically significant effect is estimated. Across all regions, living in the parental home is associated with a penalty in pay of approximately 24% compared to non-migrant graduates who no longer live with their parents.

Separately accounting for those who live in the parental home means that the differential that is estimated to exist between non-migrants who have left the parental home and migrants is smaller than the differentials that are estimated between migrants and non-migrants as a whole. However, the effect is generally not large. Even though living at the parental home is associated with poorer labour market outcomes, most graduates do leave the family home within a couple of years of graduation as they assimilate fully into the labour market. The migrant effect upon non-graduate employment remains statistically significant in Scotland and Northern Ireland (those who leave the country do better than those who simply leave home). The migrant effect upon non-graduate employment in Wales (estimated to be 31%) is statistically significant at the 10% level (a p-value of 0.078). In terms of earnings, all relative wage differentials for migrants remain statistically significant.

5. Conclusions

This paper has provided some initial analysis of graduate migration and retention in Wales as well as the employment and career outcomes for graduates. The results provide some tentative conclusions as well as pointing the way for further research.

The results for Wales affirm the findings of Bond et al (2008) which suggest that graduate migration behaviour is principally influenced by three general factors: the connections they have to various geographical places; the opportunities that are perceived to exist in such places; and the expectations they have for their future lives. First and foremost, the analysis

suggests that Wales is a net exporter of graduates, generating more undergraduates than it recruits recent graduates into employment. Moreover, Wales 'loses' potential graduate recruits both at the stages of home to university and university to labour transitions. However, the notion of a clear, unequivocal graduate brain drain has to be qualified. Wales manages to retain high numbers of graduates (relative to many English regions) and there is a clear pull of 'home' for graduates who have left the region to study elsewhere. Perhaps 'brain circulation' is a more appropriate label to use given this propensity for some to return.

Secondly, migrating has clear employment and career consequences. The analysis demonstrates that young graduates from Wales who no longer live in Wales differ compared to those who remain (or have returned). In terms of their outcomes, graduates who no longer live in Wales are less likely to be employed in a non-graduate occupation, less likely to be employed within the public sector, and more likely to have higher gross weekly earnings. These findings relate to the lower levels of earnings and higher incidence of employment among graduates generally within non-graduate jobs within Wales. The benefits of moving thus appear to outweigh those of staying and possibly of returning.

This draws attention to the significance of the relationships between graduate migration and retention and the employment structure of the regional economy. The employment opportunities available in the region are key and are likely to be shaped by existing spatial divisions of labour and the path dependencies shaping particular regions and their sectoral and occupational structures. Wales is a public sector dominated knowledge economy and the significance of this in terms of the likely career development opportunities for its graduates is significant. This raises significant questions around the relationships between graduates in Wales and the regional economy. More disaggregated analysis would be required to investigate further which types of graduates (by subject) are leaving. For example, are STEM graduates more prone to leave despite these being the very subjects being promoted by HE policy in Wales? The findings perhaps suggest the need to develop policies which make the courses taught at local universities more appropriate for the specialised needs of their regional economies (see Simmie et al, 2006), as well as the need for greater attention to be paid to the possibility of nurturing graduate entrepreneurs in the region.

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