

Stay, leave or return? Patterns of Welsh graduate mobility

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Summary

This paper presents the initial findings of a study into Welsh graduate mobility within the UK, which has a highly uneven geography of graduate labour. After surveying recent debates, the paper explores the extent to which Wales retains its graduate labour by examining the scale of graduate mobility and its nature in terms of qualifications. It does this by augmenting the data produced by the Higher Education Statistics Agency (HESA) with detailed analysis of Labour Force Survey (LFS) data to consider the location of successive 'young' graduate cohorts since the 1992 expansion of Higher Education. The research finds that Wales is a net exporter of graduates and that those who migrate have higher educational attainment. However, the notion of a clear, unequivocal brain drain has to be qualified. Wales manages to retain high numbers of graduates relative to many English regions. The paper highlights that inter-regional flows of graduates are sensitive to the path dependencies of mobile graduates themselves as well as the structures of regional economies. This has implications for both Higher Education and regional development policies.

Keywords: Graduates, mobility, inter-regional migration, qualifications, Wales.

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: 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 some critical research themes. 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.

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 has not yet emerged (Drinkwater and Blackaby, 2004, *cf.* Fevre, 2004; Tyers *et al.*, 2006).

The aim of this paper is to address this gap by establishing the extent to which Wales retains its graduate labour in employment. 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) data to provide new insights into the patterns of graduate mobility and how this relates to qualifications. In contrast to previous research (for example, Faggian *et al.*, 2007) the approach does not use multivariate analysis to explore possible explanatory variables for graduate mobility. Rather it draws from descriptive statistics in order to contribute to the existing literature on inter-regional flows of graduates and to highlight that these are sensitive to the path dependencies of mobile graduates themselves as well as the structures of regional economies.

The paper is now organised as follows. The next section provides a summary literature review of recent debates, focused on the UK which has a highly uneven geography of graduate labour. The subsequent section establishes the nature and scale of graduate mobility to and from Wales within the UK, firstly by providing an overview of evidence from previous studies which have used HESA data. The analysis then turns to an examination of graduate migration among the graduate population who completed their studies since 1992, a period characterised by a significant expansion in Higher Education. This considers both the extent and direction of migration and the relative characteristics of migrant and non-migrant graduates measured in terms of their educational attainment and subjects of study. The paper then establishes some conclusions.

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). A number of recent studies have 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 data, Wright (2011) finds that most young graduates (that is, those aged between 20 and 29) live in London and the South East. Wales, Northern Ireland and the North East each have less than five per cent 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. 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. Young graduates in regions outside of London and the South East are disproportionately employed in the public sector. For example, about 45 per cent of Wales' young graduates work in the public sector. The implications are that public sector cuts will threaten the ability of these 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 per cent 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. This is echoed by a study by Coombes *et al* (2003) of the preferences of graduates from Welsh Higher Education institutions when seeking employment, which concludes that the most important factors for graduates are job satisfaction and career development prospects.

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.

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.

However, there is increasing evidence to suggest that graduate mobility changes and evolves over time. As Hoare and Corver (2010: 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.*, 2006).

Different graduates also have different propensities to migrate, ascertained by the use of multivariate analysis. 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 (see, for example, Faggian *et al.*, 2007; Faggian, Li and Wright, 2008).

Patterns of Graduate Mobility

The paper now provides a statistical portrait of the extent and nature of graduate migration to and from Wales within the UK. Previous research has tended to focus on HESA destination data. This is unrivalled in terms of its coverage of the graduate population, but it is limited as information is collected on graduates just six months following graduation, thus not capturing the full extent of graduate migration. To provide additional insights the analysis therefore draws from new analysis of the LFS. However, LFS data does not allow for comparison of graduate retention rates between the devolved nations and the English regions, as English region of birth is not recorded.

An Overview using HESA Data

HESA datasets have been utilised in previous analyses of graduate migration (see for example Mosca and Wright, 2010; Hoare and Corver, 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. This analysis is confirmed with recent data from HESA which provides information on country of domicile by country of study for full-time first degree students for 2009/10. Table 1 reveals that Wales' low retention rate of home students is pronounced compared to England and Scotland. Almost a third 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 three per cent of this group coming to Wales to study (25,220 students), this equates to nearly three-quarters of the number of Wales-domiciled students staying in Wales to study (at 34,950), or 42 per cent 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 1: Country of domicile by country of study for full-time first degree students (% & number), 2009/10

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

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

Though Wales has a lower retention rate than the other home nations, a significantly higher proportion of Welsh residents remain in Wales to study than is average across the English regions. Table 2 demonstrates that 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. The relatively large number of universities in Wales given the size of the Welsh population, and possibly a stronger desire among Welsh students to remain in Wales during the course of their studies, contributes to a higher proportion of 'home' domiciled students remaining in Wales than that which is typically observed across the regions of England.

Table 2: 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.

A similar situation is observed when considering the first employment flows of graduates following university. Table 3 reveals that Wales is 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). This finding is not surprising given the extent to which Wales imports students to its universities from other parts of the UK. However, it is also noted that whilst the Wales retention rate of graduates is lower than the other home nations, it is higher than that observed among a majority of English regions, with only London and the North West retaining a higher proportion of their undergraduates. Whilst Wales has relatively low retention rates, both in terms of the home to university and the university to work transition, analysis of HESA data by the Welsh Government suggests that the net flow of graduates out of Wales in 2008/09 equated to approximately 600 people. Whilst approximately 1,700 graduates from Welsh Higher Education institutions found work outside Wales, 1,100 non-Welsh graduates found work in Wales (WAG, 2010).

HESA data provide useful insight regarding the geographic 'pathways' followed by those who have attended a Welsh Higher Education institution. This is particularly pertinent given the large inflow of English students to study in Wales. Applying their HULT model (explained in section 2 above) to HESA data, 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, shown in Table 4. This confirms 'locals' as the most significant source of graduate labour recruitment for Wales (at 60 per cent of total employed graduates), compared to 'stayers' (at 13 per cent). Wales also exhibits a relatively high proportion of graduates who return to their region of domicile to work after studying elsewhere, with 'returners' comprising 19 per cent of total employed graduates for Wales six months after graduation in the 2005/06 cohort.

Table 3: UK Distribution of employed undergraduate graduates (including non-degree) six months after graduation (%), 2002/03 – 2006/07

Country 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
Yorkshire & The 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

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

Table 4: Graduates from 2005/6 who were working six months after graduation, by region and location of domicile and study (Numbers & % 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.

Migration among Post-1992 Young Graduates Using LFS Data

As explained above, HESA data cannot provide a longer-term picture of the migration patterns of graduates, nor much information on their personal characteristics, therefore limiting understanding of the characteristics of graduates associated with migration. This analysis draws from LFS data for the period 2006 to 2010. The LFS is the largest regular survey of households conducted in the UK, with individuals in some 60,000 households being interviewed each quarter.

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 analysis also focuses upon 'young' graduates, defined as those aged 25 or below at the time of their graduation. The LFS

does not contain any information regarding mode of study (that is, full or part time). However, the LFS does ask those respondents with a degree or higher degree the year and age at which they completed their studies. It is assumed that the age of 25 represents the point where individuals who obtain a degree are most likely to have participated in Higher Education on a full-time basis. 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 choices following graduation. Finally, the analysis is further restricted to those people who are no longer in full-time education.

Turning to the patterns of migration exhibited by post-1992 graduate cohorts, Table 5 considers migration between the home nations for the non-student population who were under the age of 45 at the time of the LFS. England's three most prosperous regions are separately distinguished from the rest of England. London and its two major commuting regions, the East and South East, are subsequently referred to as the Inner Region Core (IRC). This is because simple comparisons of the relative circumstances of graduates between England and the other devolved nations of the UK would be confounded by the unique economic circumstances and opportunities for graduates that exist within the IRC.

Table 5 shows the overall strong relationship between being a graduate and a higher incidence of mobility, with 36 per cent of those who have migrated from their country of birth being in possession of a degree, compared to 19 per cent of those living in their country of birth. It also shows broad differences between constituent parts of the UK. Considering Wales, 15 per cent of those under the age of 45 who were both born and live in Wales possess a degree or higher degree, compared to 44 per cent of Welsh migrants living elsewhere in the UK. This 29 percentage point difference between Wales' degree holding non-migrants and migrants contrasts to a 12 percentage point difference for England, a 20 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 5: Non-Student Population under Age 45 in Possession of a Degree/Higher Degree (%)

Country of birth	Region of residence					Migrant Summary		
	IRC	Rest of England	Wales	Scotland	N. Ireland	Non-Migrants	Migrants	Total
England	25.0	16.4	28.6	34.9	24.7	19.4	31.1	19.7
Wales	55.9	37.4	14.6	38.8		14.6	43.9	19.8
Scotland	48.9	28.5	27.5	15.6	22.8	15.6	35.7	18.4
N. Ireland	50.3	43.6	32.9	61.5	18.0	18.0	48.8	22.0
Total	25.8	16.8	17.7	18.1	18.3	18.9	36.4	19.7

Source: Labour Force Survey 2006-2010

Table 6 considers patterns of migration among young graduates who completed their studies since 1992. It can be seen that over 95 per cent of English-born graduates remain in England. The retention of graduates is lowest within Wales, where 38 per cent of Welsh-born graduates who have completed their studies reside elsewhere in the UK. This retention rate is markedly lower than that observed within Scotland (75 per cent) and Northern Ireland (74 per cent). The relatively low retention rate estimated for Wales is consistent with findings from HESA data. However, the LFS does not record information on region of birth so it is not possible to compare the Welsh graduate retention rate with that of the English regions.

Table 6: UK Migration among Post-1992 Young Graduates (%)

Country of birth	Region of residence					Migration Incidence (%)
	IRC	Rest of England	Wales	Scotland	N.Ireland	
England	44.8	51.9	1.6	1.6	0.1	3.3
Wales	17.5	19.6	61.9	1.0	0.0	38.1
Scotland	13.5	10.5	0.6	75.0	0.4	25.0
N. Ireland	7.6	11.1	0.4	7.4	73.5	26.5
Total	39.6	45.5	4.3	7.6	3.0	7.5

Source: Labour Force Survey 2006-2010

Whilst the proportion of English-born graduates who migrate from England is relatively small (three per cent), the size of this pool of English graduates is relatively large. Despite its low retention rate of Welsh-born graduates, it remains the case that the number of graduates leaving Wales may be being offset by graduates moving into Wales from other parts of the UK. The net migration of graduates is considered in Table 7. It can be seen that England has been a net recipient of post-1992 graduates, with a net inflow equivalent to 1.5 per cent of the post-1992 UK young graduate population. By definition, the other devolved regions of the UK are net exporters of young graduates.

Table 7: Net Migration among Post-1992 Young Graduates (%)

Country of birth	Region of residence						Net Flow (% live - % born)
	IRC	Rest of England	Wales	Scotland	N.Ireland	Total	
England	37.5	43.4	1.3	1.4	0.1	83.7	1.5
Wales	0.8	0.9	2.9	0.1	0.0	4.6	-0.4
Scotland	1.1	0.8	0.1	5.9	0.0	7.9	-0.3
N.Ireland	0.3	0.4	0.0	0.3	2.8	3.9	-0.9
Total	39.6	45.5	4.3	7.6	3.0	100.0	

Source: Labour Force Survey 2006-2010

Graduate Migration and Educational Attainment Among the Post-1992 Graduate Cohort

The analysis now focuses on the 'quality' of migrant and non-migrant graduates in terms of their educational attainment. English graduates are excluded from the analysis. As discussed above, English graduates who migrate between regions within England cannot be identified, making it difficult to accurately compare the characteristics of migrant and non-migrant English graduates.

Table 8 firstly considers the pre-entry level qualifications held by post-1992 young graduates. The LFS provides very limited information about the number of A-levels possessed by respondents, simply recording whether or not those respondents with A-levels possess one or more than one. As a very large majority of the post-1992 graduate cohort would be expected to have more than one A-level upon entry to university, this measure is not useful in terms of measuring the academic ability of students upon their entry into Higher Education. To provide a more discriminating measure of educational attainment prior to commencing a degree, information on the number of GCSE passes achieved by respondents is considered. It should be noted

that educational attainment based on this measure is not comparable across countries due to differences in qualification structures. In Scotland, this measure comprises the number of passes achieved at the Intermediate Level of Scottish National Qualifications. It can be seen that across each devolved nation, graduates who no longer live in that country are demonstrated to possess a higher number of GCSE (or equivalent) passes. This differential is widest among Scottish graduates.

Table 8: Pre-Entry Educational Attainment of Post-1992 Young Graduates

	% with 8+ GCSEs		
	Non-Migrants	Migrants	Differential
Wales	78.2	81.5	3.2
Scotland	53.8	61.1	7.3
N. Ireland	71.3	76.5	5.2
All	64.1	72.0	7.9

Source: Labour Force Survey 2006-2010

Table 9 provides information on the proportion of graduates who go on to take postgraduate qualifications. It can be seen that graduates no longer living in their region of birth are more likely to hold a postgraduate qualification. This differential is approximately six percentage points among graduates born in the devolved nations. Comparisons of degree class are difficult to make across countries. Prior to 2007, the LFS only recorded details of the highest Higher Education qualification achieved. If respondents had gone on to undertake a postgraduate degree, details of undergraduate degree class would not be recorded. The situation is again further complicated by differences in the educational system in Scotland, where many undergraduates are awarded a Masters degree and therefore a higher proportion of Scottish graduates record that they achieved a pass for their degree compared to other countries of the UK. Analysis undertaken (not presented) revealed that little difference emerged between migrant and non-migrant graduates in terms of degree classification. This is probably not surprising as all universities, whether they be traditional or 'new' universities formed during the 1990s, will award degrees of varying classifications. In the absence of information in the LFS about the type of institution attended (for example, Oxbridge, Russell Group, post-1992), degree class may not be a very discriminating measure of ability compared to pre-entry qualifications.

Table 9: Proportion of Post-1992 Young Graduates in Possession of a Postgraduate Qualification

	% with Higher Degree		
	Non-Migrants	Migrants	Differential
Wales	21.0	28.5	7.4
Scotland	22.6	29.4	6.8
Northern Ireland	23.6	28.3	4.7
All	22.5	28.8	6.4

Source: Labour Force Survey 2006-2010

Graduate Migration and Subject Studied Among the Post-1992 Graduate Cohort

The LFS gathers data on degree subject area. The responses of young post-1992 graduates are presented in Table 10 using two classifications of subject areas. The first is a four-fold breakdown of degree subject areas. It can be seen that 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 (27 per cent) compared to those who have migrated away from Wales (19 per cent). Conversely, those Welsh graduates who remain living in Wales are less likely to have studied Science, Engineering and Technology (SET) related subjects (a differential of 9 percentage points). Wales has the lowest proportion of non-migrant graduates who have studied a SET-related subject.

Both the English and Welsh Higher Education Funding Councils have placed considerable emphasis on the importance of STEM subjects (Science, Technology, Engineering and Mathematics) which are regarded as strategically important and vulnerable. The Higher Education Funding Council for Wales has identified STEM subjects as requiring additional investment and has implemented projects to address issues of student demand for these (HEFCW, 2011). The bottom panel of Table 10 shows the proportion of graduates who have undertaken STEM degrees. Across each of the devolved nations of the UK, migrant graduates are more likely to possess STEM degrees. This differential is widest in Wales, where the proportion of graduates with STEM degrees is 7 percentage points higher among migrant graduates.

Table 10: Subject Studied of Post-1992 Young Graduates

	Non-Migrant	Migrant	Differential
Wales			
Medical, Education and Vocational	26.5	19.4	-7.1
Science, Engineering and Technology (SET)	26.6	34.8	8.2
Social Sciences	20.8	19.9	-0.9
Arts, Humanities	26.1	25.9	-0.2
Scotland			
Medical, Education and Vocational	24.1	18.8	-5.3
Science, Engineering and Technology (SET)	32.2	36.0	3.8
Social Sciences	26.6	25.3	-1.3
Arts, Humanities	17.2	19.9	2.8
Northern Ireland			
Medical, Education and Vocational	26.8	25.0	-1.7
Science, Engineering and Technology (SET)	30.1	33.1	3.0
Social Sciences	29.7	22.5	-7.3
Arts, Humanities	13.5	19.4	6.0
All			
Medical, Education and Vocational	25.3	20.4	-4.9
Science, Engineering and Technology (SET)	30.3	34.9	4.6
Social Sciences	25.7	22.7	-3.0
Arts, Humanities	18.7	22.0	3.3
STEM Summary			
Wales	35.6	42.2	6.6
Scotland	41.3	43.9	2.6
Northern Ireland	42.8	45.2	2.4
Total	40.2	43.6	3.4

Source: Labour Force Survey 2006-2010

Conclusions

This paper has provided some initial analysis of graduate migration and retention in Wales. In terms of the scale of graduate mobility, Wales exhibits low retention rates compared to the other devolved nations with regard to both the proportion of students who remain in Wales to study, and the proportion of graduates from Welsh Higher Education institutions who subsequently gain employment in Wales. Therefore 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.

In terms of the nature of migrant graduates, those who migrate from devolved nations generally possess higher levels of educational attainment, as measured by their number of GCSE passes, than those who remain. This qualification gap is relatively narrow in Wales. Graduates who migrate from devolved nations are more likely to possess a postgraduate qualification. The scale of this differential is relatively even across the devolved nations. In terms of which types of graduates (by subject) are leaving, the analysis shows that STEM graduates are more prone to leave across the devolved nations. This differential is widest in Wales, where policy is seeking to increase student uptake of these subjects.

However, the analysis suggests that the notion of a clear, unequivocal graduate brain drain has to be qualified. That Wales is a 'loser region' is not surprising given the extent to which it imports students to its universities from other parts of the UK, especially England. Wales does manage 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. 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 reflect its sectoral and occupational structure. Wales is a public sector dominated economy and the significance of this in terms of the likely career development opportunities for its graduates has implications in light of public sector contraction (Wright, 2011a; WAO, 2011). In turn this may compromise the ability of Wales to retain graduates.

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 the possibility of nurturing graduate entrepreneurs in the region. However, they also point to the need to consider the demand for graduates and associated issues of graduate skills utilisation. Felstead (2004; 2009) has observed that the Welsh economy has not upskilled sufficiently to keep pace with a rising supply of qualified labour. An important avenue for further research is therefore to gain a more detailed understanding of Welsh graduate labour market outcomes, in terms of Elias and Purcell's (2005) classification of graduate and 'non-graduate' occupations, and how these relate to migration behaviour. In turn, it would also be useful to consider the geography of the Welsh graduate labour market, not least the role of its cities. Such analysis, which ascertains the relative paucity and distribution of graduate level employment in Wales, is likely to have challenging policy implications in terms of the scope for rebalancing former industrial economies.

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