Impact of Higher Education Institutions on Regional Economies
A Joint Research Initiative

National and International Graduate Migration Flows (*)

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National and International Graduate Migration Flows

Abstract This paper examines the nature of national and international graduate migration flows in the UK. Migration equations are estimated with micro-data from a matched dataset of *Students* and *Destinations of Leavers from Higher Education* information collected by the Higher *Education Statistical Agency*. The probability of migrating is related to a set of observable characteristics using multinomial logit regression. The analysis suggests that migration is a selective process with graduates with certain characteristics having considerably higher probabilities of migrating both to other regions of the UK and abroad.

Introduction

One of the key outputs of the higher education sector is the production of skilled labour. It is well-known that, on average, the employment rates and earnings of graduates are considerably above those of non-graduates, suggesting that employers to a certain extent value the skills being generated by the UK higher education sector. It is equally well-known that there is a tendency for graduates to study in and stay after graduation in the region where they studied. However, there is a considerable amount of movement of graduates between different regions of the UK e.g. between England, Northern Ireland, Scotland and Wales. Likewise there is a considerable amount of movement abroad. The main purpose of this paper is to quantity the extent of this movement. In addition, an attempt is made to explore empirically the determinants of graduate migration flows.

Data

The analysis is based on micro-data collected by *Higher Education Statistical Agency* (HESA).[1] More specifically, information is merged from two data-sets for five graduation

[1] HESA is the official agency for the collection, analysis and dissemination of quantitative information about higher education in the United Kingdom. One of its main objectives is to manage a system of data collection, analysis and dissemination aimed at facilitating research. Further information can be found at: www.hesa.ac.uk .

cohorts of higher education institutions (HEI) students, covering the academic years 2002/03 to 2006/07. The first data-set is the *Students in Higher Education Institutions.*[2] This primarily consists of information provided by the HEI at which the individual studied. As is discussed in more detail below, variables include subject of study, level of study, class of qualification mode of study, age, gender and place of domicile. The second data-set is the *Destinations of Leavers from Higher Education Institutions (DLHE).*[3] This data is collected through a questionnaire administered approximately six months after the student has graduated. Detailed information about employment and further study is collected.

In this merged data-set, there are three post codes of interest. The *first* is the post code corresponding the individual's so-called "place of domicile". This is the postcode of the student's permanent or home address prior to entry to the programme of study. Although imperfect, for the vast majority of graduates this will also be the place where they completed at least some of their secondary schooling. The *second* post code is "place of study". This is simply the address of the HEI attended. *The third* is the post code that corresponds to their "place of employment six months after graduation". Subject to data limitations discussed below, with these three post codes it is possible to identify if an individual has moved from their place of domicile to their place of study and from their place of study to their place of employment. For those in employment six months after graduation it is possible to calculate migration rates once the level of geographic aggregation has been decided.

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[2] For background information and descriptive cross-tabulations see the following annual publication: *Students in Higher Education Institutions*, Cheltenham, Higher Education Statistical Agency. Available at: www.hesa.ac.uk/index.php?option=com_pubs&Itemid=122.

[3] For background information and descriptive cross-tabulations see the following annual publication: *Destinations of Leavers from Higher Education Institutions*, Cheltenham, Higher Education Statistical Agency. Available at: www.hesa.ac.uk/index.php?option=com_pubs&Itemid=122.

The *Destinations of Leavers* survey also interviews graduates who have moved abroad. Therefore, with this data it is not only possible to identify graduates who have moved to other parts of the UK ("national movers") but also graduates who have emigrated abroad ("international movers"). For the purpose of this paper, the level of geographic aggregation for national movers is four countries of the United Kingdom: England, Northern Ireland, Scotland and Wales. Such a division makes considerable sense when it is remembered that Northern Ireland, Scotland and Wales have elected devolved administrations whose responsibilities include matters related to all levels of education. For some analysis, England has been further disaggregated into the nine standard "NUTS1" regions: East, East Midlands, London, North East, North West, South East, South West, West Midlands and Yorkshire and Humber.[4]

There are a series of problems associated with using differing post codes to proxy migration. Essentially all these problems manifest measurement error. It is important to note that the survey did not collect any information on the graduate's home address (such as their post code) at the time of graduation. The only information provided is the postcode of the student's permanent or home address prior to entry to the programme of study. Another problem is that given that "place of employment" is measured six months after graduation, short-term repeat migration will be missed. For example, a graduate might move from their place of study three months after graduation and then move back to their place of study two months later. This individual would be miss-classified as a "stayer". Likewise for distance learning students, such as those studying at the Open University, allocating place of study would almost certainly miss-classify them as "movers". In our analysis, all distance-learning students are assumed to be "stayers". There is also problem dealing with HEIs that have multiple campuses since the data usually only report the name of the institution, with the

[4] For more detailed information relating to how these English regions are defined see the Office of National Statistics, "Regional Trends" website: www.statistics.gov.uk/statbase/product.asp?vlnk=836 .

researcher having to map in the post code. Although it is possible for some cases to identify the geographic location of the campuses, this weakness with the data generates some measurement error. It is also clear that many students commute. For example, it is believed that a sizeable number of students who study at HEIs in London commute on regular basis from regions outside of London. Commuting is likely to be even more prevalent for students studying on a part-time basis. This is a potential further source of measurement error since for some of these students' place of domicile will not be the same as place of study given post code information. As a consequence they would be incorrectly classified as "movers".

The *DLHE* survey is a sample of graduates six months after graduations. Since it is a sample, there is always a concern about its overall representativeness. HESA claims a response rate above 75 per cent. They also state that the data is representative of the graduate population. It is hard to substantiate this claim. However we are not aware of any hard empirical evidence to the contrary. Likewise, our discussion with other researchers using this data does not support the view that the data is non-representative. Nevertheless, graduates who have been more successful in finding appropriate employment may exhibit a higher response rate. For example, those employed in what are termed "non-graduate jobs", might have a lower response rate. Along similar lines, those less successful might be more reluctant to report details relating to their employer (like post code). It may also be the case that individuals report the post code of their firm's head office rather than the post code of their actual place of work. Finally there is the problem of those who work remotely, who through the use of information technology and the internet "work" geographically away from their employer. Again it is difficulty to establish the seriousness of these problems. However, only a negligible percentage of graduates in employment six moths after graduation included in the database did not report all three post code of interest to us. It is worth noting, that the majority of these issues would be less problematic, and could be dealt with in a more systematic way, if the post code of where graduate actually lives, in addition to the post code of their place of employment.

The above discussion has highlighted some of the problems using post code information to identify migration patterns. In this respect it is clear that the data has some important limitations. However, it should be kept in mind that the seriousness of these problems likely become more important the greater the level of geographic disaggregation. Since the primary focus of the analysis included in this paper is on the movements of employed graduates amongst the four countries of the UK and abroad, we believe that our findings are relevant.

It is important to stress that HESA does not compile similar data for international students so all the estimates reported in this paper refer to UK-domiciled students. In addition, all estimates are reported separately for "undergraduate graduates" (including individuals being awarded qualifications below degree-level) and "postgraduate graduates". Although it is common to pool these two groups together, our analysis suggests that they are quite different. Formal statistical tests (not reported here) indicate that they should be treated as distinct populations particularly in regression analysis.

Findings

Although this paper is primarily concerned with migration after graduation, Table 1 is a cross tabulation of country of domicile by country of study for the five graduate cohorts pooled together. If all graduates studied in their country of domicile, then the diagonal cells in this matrix would each be 100%. Although the majority of graduates study in their country of domicile, there is a considerable amount of movement from country of domicile to country of study. For example, for Wales-domiciled undergraduate graduates, 33.5% studied in England. Likewise, for Northern Ireland-domiciled postgraduate graduates, 20.5% studied in England.

Table 2 shows the estimated “stayer”, “national mover” and “international mover” rates for both undergraduate and postgraduate graduates for each graduation cohort and for the five cohorts pooled together. The data suggest that for those in employment six months after graduation, the majority are stayers. The pooled estimates indicate that 92.4% of undergraduate graduates and 92.2% of postgraduate graduates were employed in the same country as they studied. Likewise 7.6% of undergraduate graduates and 7.7% (of postgraduate graduates had moved. As the table shows, the national mover rate is about twice as large as the international mover rate. It is interesting to note that there is no clear trend from year to year.

Table 3 is a cross tabulation of country of study by country of employment six months after graduation. Similar to Table 1, if all graduates were employed in the country in which they studied, the diagonal cells in this matrix would be 100% for each of the four countries and “0%” for the “Abroad” cell. This is clearly not the case—again there is a considerable amount of regional variation. More specifically, graduates of English HEIs have the highest stayer rates. 95.7% of undergraduate graduates and 94.9% of postgraduate graduates are employed in England. The lowest stayer rates are for graduates of Welsh HEIs. Only 61.3% of undergraduate graduates and 64.1% of postgraduate graduates are employed in Wales. As the table shows, about a third of Welch HEI graduates are employed in England. Northern Irish graduates have the highest international mover rates, with 3.9% of undergraduate graduates and 3.4% of postgraduate graduates employed outside the UK.

Table 4 examines the relationship between country of study and country of employment in more detail. This table shows the distribution of employed graduates broken down further using English regions.[5] It is interesting to note that the share of graduates from Northern

[5] The sample sizes are different in Tables 3 and 4 because of missing postcode information. Therefore, it was not possible to allocate a specific NUTS1 region to all graduates working in England. The observations were therefore excluded from the calculations of the estimates presented in Table 4.

Ireland, Scotland and Wales moving to London is not excessively large. The highest rate is 5.5% for postgraduate graduates who studied in Wales. The lowest rate is 0.4% for undergraduate graduates who studied in Northern Ireland. However, when English regions are considered there is considerable variation. For undergraduate graduates, the lowest stayer rate is 41.8% for graduates of HEIs in the South East, with 25.7% of the total moving to London. For undergraduate graduates, the highest stayer rate is 71.3% for graduates of London-based HEIs. The ranking is somewhat different for postgraduate graduates. The lowest stayer rate is 47.8% for graduates of East Midlands HEIs, with 8.1% of the total moving to London. The highest stayer rate is 71.1% for graduates of North West HEIs. This is slightly higher than the 70.6% for graduates of London HEIs.

Table 5 reports on a further source of variation between country of study and country of employment. More specifically this table shows the stayer, mover and international mover rates broken down by place of study *and* place of domicile. Basically the rates are calculated separately for graduates who studied in their country of domicile (e.g. England-domiciled students studying in England) and for graduates who studied in a country different to their county of domicile (e.g. Northern Ireland-, Scotland- and Wales-domiciled graduates who studied in England). The latter group is denoted by RUK ("Rest of the United Kingdom") in Table 5. What is immediately clear is that there are large differences in these rates between "own-domiciled" and "RUK-domiciled graduates". In all cases, the stayer rate is considerably lower for "RUK-domiciled graduates". For example, for undergraduate graduates who studied in Scotland, the stayer rate for Scotland-domiciled students is 92.0% compared to 37.4% for RUK-domiciled graduates. In addition, for undergraduate graduates it is always the case that the international mover rate for RUK-domiciled graduates is higher than for own-domiciled graduates. For postgraduate graduates, this is also the case for graduates of English, Welsh and Scottish HEIs but not for graduates of Northern Irish HEIs.

There also appears to be a relationship between “place of domicile” and “place of employment”. For example, around 13.3% of those who studied in Scotland, Wales or Northern Ireland are England-domiciled graduates who returned to England to work. Of this total, 68.3% of these returned to the same region of domicile (i.e. they returned “home”). Put differently, 2.9% of England-domiciled students moved to Scotland, Wales or Northern Ireland to study return to England to work. 68.3% of these return to the same (NUTS1) region of domicile.

Table 6 shows the country distribution of international movers. The European Union is the main destination region. Of the total who had moved abroad, 44.1% of undergraduate graduates and 35.6% of postgraduate graduates had moved to the European Union, with France, Germany, Ireland, Italy and Spain making up the main destination countries. The most popular destination country for undergraduate graduates is France, accounting for 16.9% of the total, followed by the United States at 9.2%. The most popular destination country for postgraduate graduates is the United States, accounting for 14.5% of the total. Somewhat surprising Ireland is the second most popular destination country at 7.1%.

At first glance, it may appear 'surprising' that Ireland is the second most popular destination country for postgraduate graduates. The data suggest that there is a considerable amount of movement between Northern Ireland and the Republic of Ireland. In our data period, there were 9,019 post-graduates studying in Northern Ireland. Of these, 311 moved abroad to work - in percentage terms, this is 3.4% of post-graduates who studied in Northern Ireland. Of those moving abroad to work, 63% (196) moved to Ireland.

Regression Analysis

In this section, a multinomial logit regression model is used to examine the possible determinants of graduate migration flows. This model is non-linear which implies that interpretation is less straightforward than in linear regression. Essentially it conveniently summarises how the probability of the outcome of interest is related to a set of explanatory variables. In our application, the outcome variable takes on three possible values: (1) Stayer; (2) National mover; and (3) International mover, with the reference or baseline category being stayer. Therefore the estimated effects are relative this group.[6] In keeping with the descriptive analysis presented above, the model is estimated separately for undergraduate graduates and postgraduate graduates.

The explanatory variables are summarised in Table 7. All the variables used in the analysis are categorical so the table also gives the descriptive statistics as percentages. In our view, the use of categorical variables makes the interpretation of the results easier. Although this list of included variables is not complete, the selection does represent factors that others have found to be correlated with migration decisions.[7] The variables considered are:

[6] For a comprehensive treatment of the multinomial logit model see Chapter 24 in Greene, W., (2007), Econometric Analysis, 6th Edition, London, Pearson Education.

[7] See for example the studies of: Faggian, A. and P. McCann, (2006), "Human Capital Flows and Regional Knowledge Assets: A Simultaneous Equation Approach", *Oxford Economic Papers*, vol. 52, pp. 475-500; Faggian, A., P. McCann and S. Sheppard, (2006), "An Analysis of Ethnic Differences in UK Graduate Migration Behaviour", *Annuals of Regional Science*, vol. 40, pp. 461-471; Faggian, A., P. McCann and S. Sheppard, (2007), "Human Capital, Higher Education and Graduate Migration: An Analysis of Scottish and Welsh Students", *Urban Studies*, vol. 44, pp. 2511-2528; Faggian, A., P. McCann and S. Sheppard, (2007), "Some Evidence That Woman Are More Mobile that Men: Gender Differences in U.K. Graduate Migration Behavior", *Journal of Regional Science*, vol. 47, pp. 517-539; and Faggian, A., Q.C. Li and R.E. Wright (2009),"Graduate Migration Flows in Scotland", *Fraser of Allander Economic Quarterly* vol. 33, no. 1, pp. 55-60.

- Sex
- Mode of study
- Disability status
- Ethnicity
- Class of qualification
- Subject studied
- Type of institution
- Age at graduation
- Moved to study
- Country of domicile
- County of study
- Cohort

The table also shows the categories that were chosen as the excluded categories.

Most of these variables are self-explanatory but several require further explanation. Class of qualification was not available for postgraduate graduates. For the variables that had missing data, instead of removing them from the sample, variables representing missing information were created and these were included. Although it is difficult to interpret the "effects" of these variables, we believe they help reduce selection bias resulting from the exclusion of cases with missing information. The categories used for subject studied were arrived at after some experimentation. "Science-led", "Social-Science-led" and "Arts/Humanities-led" refer to joint and mixed qualifications with subjects from these fields dominant. HEIs are divided into four groups: "Russell" universities belong to a collaboration of twenty leading UK universities that receive around two-thirds of research grant funding in the UK, "Old" universities were already classified as universities before 1992 but do not belong to the Russell Group, "post-1992" universities were classified as polytechnics until

1992 and “specialist HEIs” include those institutions where subjects including music, dance, drama or art are taught.

The variable “Moved to Study” captures whether the individual moved region to study. In order to construct this variable, England was divided into the nine NUTS1 regions (as discussed above), Scotland was divided into seven regions based on a council area aggregations[8], Wales was divided into three regions (South-, Mid- and North Wales); and Northern Ireland divided into two regions (Belfast and not-Belfast). These regions were constructed in such a way to insure that all regions have HEIs in them. Based on this classification, a graduate was classified as “moved to study” if their region of domicile is not the same as region of study. It is quite well known in the migration literature that an individual who has moved in the past has a considerably higher probability of moving in the future. Although this variable is crudely measured, it is an attempt to capture this important form of “path dependence”.

The estimates of the multinomial logit regressions models are summarised in Table 8. Because of the very large sample sizes, almost all of the coefficients are statistically significant at conventional threshold levels. For both equations, the pseudo-R^2 values are above 20%, which implies a very good fit remembering that these models are estimated with micro-data. In fact, this is a high value given that the equations were estimated with individual-level data.

[8] Aberdeen City Region (Aberdeen City and Aberdeenshire), Dundee City Region (Dundee, Angus and Perth & Kinross), Edinburgh City Region (East Lothian, City of Edinburgh, Midlothian and West Lothian), Stirling (Stirling, Falkirk and Clackmannanshire), Fife, Glasgow City Region (Glasgow, North Lanarkshire, South Lanarkshire, East Renfrewshire, Renfrewshire, Inverclyde, East Dunbartonshire, West Dunbartonshire, East Ayrshire, North Ayrshire, South Ayrshire) and Highlands, Moray & Islands (Argylle & Bute, Highlands, Moray, Eilean Siar, Orkney, Shetland, Scottish Borders and Dumfries & Galloway)

Turning first to undergraduates graduates, men compared to women have a higher probability of migrating. That is, men have a higher probability of being both national and international movers, although the effect is most pronounced for international movers. Graduates who studied full-time compared to those who studies part-time have a lower probability of being a national mover but have a higher probability of being an international mover. However, this finding must be viewed with some caution since those studying part-time likely have a higher probability of commuting (as discussed above).Graduates with a disability have a higher probability of migrating and the effect is similar for both types of moves. Being of non-white ethnicity is associated with a lower probability of migrating.

There is a clear gradient with respect to the class of qualification obtained. The higher the class of qualification obtained, the higher the probability of migrating, with the effect being larger on the probability of being an international mover compared to being a national mover.

The results for subject of study are more mixed. Science qualifications (compared to arts and humanities qualifications) are associated with a higher probability of being a national mover but a lower probability of being an international mover. The effect is similar for science-led qualifications but less pronounced. Interdisciplinary qualifications are associated with a higher probability of migrating but the effect is largest on the probability of being a national mover. Social science qualifications are associated with a lower probability of being an international mover. However, the opposite is the case for social science-led qualifications—this area of study is associated with a higher probability of moving both nationally and internationally. There is little difference between arts and humanities-led qualifications and arts and humanities qualifications. Those who graduated from a "specialist" HEI (such as an art or music college) have a higher probability of being a national mover and a lower probability of being an international mover. Compared to being a graduate of "old universities", graduates of Russell Group universities have a higher probability of migrating while graduates of "Post-1992 universities" have a lower probability

of migrating. These effects are much stronger in the opposite directions on the probability of being an international mover. The results suggest that the probability of migrating declines sharply after the age of 30.

Graduates who moved regions to study have a higher probability of migrating. However, this effect is much larger on the probability of being a national mover compared to being an international mover. There are some clear differences by country of domicile and country of study. However, as was highlighted by Table 5, there is clearly an interaction between country of domicile and country of study that is not likely captured by the inclusion of dummy variables for each. It is our view that in order to understand how country of domicile and country of study affect the probability of migrating, country and domicile-specific equations need to be estimated. However, this task is outside the scope of this current paper. Finally, the results suggest that the probability of migrating has declined slightly for the more recent graduate cohorts included in the analysis.

In terms of the direction of the effects of the included variables the findings for postgraduate graduates are surprisingly similar. However, there are some differences worth noting. The probability of postgraduate graduates migrating does not appear to be affected by disability status. Graduates of a non-white ethnicity have a higher probability of being an international mover. More recent cohorts of graduates have a lower probability of being a national mover.

How “big” are the effects of these variables? One way to attempt to answer this is to use the regression equations to “predict” the probability of migrating nationally and internationally for hypothetical graduates “made up” of different combinations of the variables included in the regression equations. The obvious baseline for comparison is the hypothetical graduate who is represents the mean values of the variables. For this graduate (Graduate A) the predicted probabilities of migrating are the same as the proportions in each category in the raw data (i.e. the actual values, see Table 2). For illustrative purposes this hypothetical graduate is

compared to one who is a white, non-disabled male who studied full-time, graduated between the ages of 20 and 24 with a 1st class science qualification from a Russell Group university and has moved to another region in order to study (Graduate B).

The probabilities associated with these two graduates are given in Table 9. For both undergraduate graduates and postgraduate graduates, the probability of migrating is over twice as large for Graduate B compared to Graduate A. For undergraduate graduates, the probability of being a national mover increases from 5.2% to 11.7% and the probability of being an international mover increases from 2.4% to 5.6%. As the table shows, the increase in the propensity to migrate in percentage terms is about the same for both types of moves. For postgraduate graduates, the probability of national movers increases from 5.1% to 13.2% and the probability of being an international mover from 2.6% to 5.3%. Again as the table shows in this comparison the impact is larger in percentage terms on moving nationally compared to moving internationally.

Concluding Comments

Data collected by the Higher Education Statistical Agency suggest that a large number of UK-domiciled graduates are working outside the United Kingdom six months after graduating. Of the five graduation cohorts spanning the academic years 2002/03 to 2006/07, about 2.4% of undergraduate graduates and 2.6% of postgraduate graduates were working abroad. There is also movement of graduates around the countries of the UK. Data for the same period suggest that about 2.1% of undergraduate graduates of English HEIs are working in Northern Ireland, Scotland or Wales six months after graduation. The analogous estimates for Northern Ireland, Scotland and Wales are much higher at 4.3%, 13.3% and 36.3%, respectively. It is also interesting to note that there is considerable variation in the proportion of graduates who return to their country of domicile after studying in one of the other countries of the UK. For example, 61.9% of England-domiciled students who studied in Northern Ireland, Scotland or Wales returned to England to work. The analogous estimates

for Northern Ireland, Scotland and Wales are 6.0%, 60.2% and 85.7% respectively. The figures are similar for postgraduate graduates. The range of estimates is even wider when regions within England are considered. Regression analysis indicates that the migration of graduates is a selective process. It is correlated with a series of characteristics, some of which capture academic performance (such as class of qualification obtained and age at graduation).

Table 1
Country of Domicile By Country of Study
2002/03-2006/07 HEI Graduate Cohorts

(a) Undergraduate graduates

		Country of Study			
		England	**Northern Ireland**	**Scotland**	**Wales**
Country of Domicile	**England**	*95.4%*	*0.02%*	*1.4%*	*3.2%*
	Northern Ireland	*13.9%*	*75.9%*	*9.6%*	*0.6%*
	Scotland	*6.8%*	*<0.1%*	*93.0%*	*0.2%*
	Wales	*33.5%*	*<0.1%*	*0.6%*	*65.9%*

Number of observations = 1,159,324

(b) Postgraduate graduates

		Country of Study			
		England	**Northern Ireland**	**Scotland**	**Wales**
Country of Study	**England**	*96.8%*	*0.2%*	*1.3%*	*1.8%*
	Northern Ireland	*20.5%*	*73.9%*	*4.5%*	*1.1%*
	Scotland	*11.7%*	*0.3%*	*87.4%*	*0.5%*
	Wales	*26.8%*	*0.2%*	*0.8%*	*72.2%*

Number of observations = 351,547

Source: *Authors calculations with HESA data (see text)*

Table 2
Stayer, National Mover and International Mover Rates
2002/03 to 2006/07 HEI Graduate Cohorts

(a) Undergraduate graduates

Cohort:	Stayer	National Mover	International Mover
2002/2003	*92.3%*	*5.2%*	*2.6%*
2003/2004	*92.4%*	*5.3%*	*2.3%*
2004/2005	*92.1%*	*5.5%*	*2.4%*
2005/2006	*92.6%*	*4.9%*	*2.5%*
2006/2007	*92.7%*	*5.0%*	*2.4%*
All years	*92.4%*	*5.2%*	*2.4%*

(b) Postgraduate Graduates

Cohort:	Stayer	National Mover	International Mover
2002/2003	*92.1%*	*5.3%*	*2.6%*
2003/2004	*92.3%*	*5.1%*	*2.5%*
2004/2005	*91.9%*	*5.4%*	*2.7%*
2005/2006	*92.4%*	*4.9%*	*2.7%*
2006/2007	*92.4%*	*5.0%*	*2.6%*
All years	*92.2%*	*5.1%*	*2.6%*

Source: *Authors calculations with HESA data (see text)*

Table 3
Country of Study By Country of Employment Six Months After Graduation
2002/03-2006/07 HEI Graduate Cohorts

(a) Undergraduate graduates

		Country of Employment 6 months After Graduation				
		England	**Northern Ireland**	**Scotland**	**Wales**	**Abroad**
Country of Study	**England**	*95.7%*	*0.3%*	*0.6%*	*1.2%*	*2.3%*
	Northern Ireland	*3.4%*	*91.8%*	*0.8%*	*0.1%*	*3.9%*
	Scotland	*11.5%*	*1.5%*	*83.5%*	*0.3%*	*3.3%*
	Wales	*35.7%*	*0.2%*	*0.4%*	*61.3%*	*2.4%*

Number of observations = 837,279

(b) Postgraduate graduates

		Country of Employment 6 months After Graduation				
		England	**Northern Ireland**	**Scotland**	**Wales**	**Abroad**
Country of Study	**England**	*94.9%*	*0.4%*	*1.0%*	*1.0%*	*2.6%*
	Northern Ireland	*6.6%*	*88.3%*	*1.4%*	*0.3%*	*3.4%*
	Scotland	*11.0%*	*0.7%*	*85.4%*	*0.3%*	*2.6%*
	Wales	*32.5%*	*0.5%*	*0.9%*	*64.1%*	*2.0%*

Number of observations = 306,924

Source: *Authors calculations with HESA data (see text)*

Table 4
Distribution of Employed Graduates 6 Months After Graduation
2002/3-2006/07 HEI Graduate Cohorts

(a) Undergraduate graduates	Stayed	London	Rest of England	Rest of UK	Abroad
Place of Study:					
England	93.5%	-	-	*2.1%*	*2.5%*
Northern Ireland	*92.9%*	*0.4%*	*1.7%*	*0.9%*	*4.0%*
Scotland	*83.7%*	*3.9%*	*7.0%*	*1.8%*	*3.6%*
Wales	*62.3%*	*4.4%*	*30.2%*	*0.6%*	*2.5%*
South East	*41.8%*	*25.7%*	*28.1%*	*1.9%*	*2.4%*
East Midlands	*42.9%*	*11.2%*	*41.9%*	*1.7%*	*2.3%*
West Midlands	*52.5%*	*11.9%*	*31.4%*	*2.2%*	*2.0%*
Yorkshire and Humber	*54.7%*	*7.8%*	*33.1%*	*1.5%*	*2.9%*
South West	*55.2%*	*13.9%*	*23.8%*	*3.7%*	*3.4%*
East	*58.9%*	*17.9%*	*19.0%*	*1.3%*	*3.0%*
North East	*59.9%*	*8.9%*	*25.3%*	*3.0%*	*3.0%*
North West	*68.1%*	*5.8%*	*20.4%*	*3.5%*	*2.2%*
London	*71.3%*	-	*25.6%*	*0.9%*	*2.2%*
Number of observations=812,433					
(b) Postgraduate graduates	**Stayed**	**London**	**Rest of England**	**Rest of UK**	**Abroad**
Place of Study:					
England	94.6%	-	-	2.5%	2.9%
Northern Ireland	90.0%	1.1%	3.8%	1.7%	3.5%
Scotland	85.5%	3.2%	7.5%	1.0%	2.9%
Wales	65.1%	5.5%	26.0%	1.4%	2.1%
East Midlands	47.8%	8.1%	39.5%	2.6%	2.1%
South East	52.7%	22.5%	20.0%	2.1%	2.7%
East	55.3%	15.9%	21.3%	2.2%	5.2%
West Midlands	56.0%	9.3%	29.9%	3.0%	1.8%
Yorkshire and Humber	61.4%	5.4%	28.5%	2.2%	2.5%
South West	62.5%	10.2%	20.3%	3.7%	3.3%
North East	67.6%	5.8%	20.4%	3.6%	2.5%
London	70.6%	-	24.7%	1.2%	3.5%
North West	71.1%	4.7%	17.5%	4.5%	2.2%
Number of observations=298,136					

Source: *Authors calculations with HESA data (see text)*

Table 5
Stayer, National Mover and International Mover Rates by Place of Study and Place of Domicile
2002/03 to 2006/07 HEI Graduate Cohorts

(a) Undergraduate graduates

Place of Study:	England		Northern Ireland		Scotland		Wales	
Place of Domicile:	England	RUK	Northern Ireland	RUK	Scotland	RUK	Wales	RUK
Stayer	*97.1%*	*53.9%*	*92.0%*	*37.4%*	*90.4%*	*24.3%*	*92.0%*	*50.3%*
National Mover	*0.7%*	*41.9%*	*5.6%*	*54.5%*	*8.6%*	*71.6%*	*4.0%*	*43.9%*
International Mover	*2.2%*	*4.3%*	*2.4%*	*8.1%*	*1.1%*	*4.1%*	*3.9%*	*5.8%*

(b) Postgraduate graduates

Place of Study:	England		Northern Ireland		Scotland		Wales	
Place of Domicile:	England	RUK	Northern Ireland	RUK	Scotland	RUK	Wales	RUK
Stayer	*96.6%*	*54.1%*	*93.4%*	*29.5%*	*83.9%*	*17.5%*	*93.3%*	*7.1%*
National Mover	*0.9%*	*40.7%*	*4.6%*	*63.7%*	*14.8%*	*79.0%*	*3.2%*	*90.4%*
International Mover	*2.5%*	*5.3%*	*2.0%*	*6.8%*	*1.4%*	*3.5%*	*3.5%*	*2.5%*

Table 6
Country Distribution of International Movers
2002/03-2006/07 HEI Graduate Cohorts

	Undergraduates		**Postgraduates**
European Union:	*44.1%*	**European Union:**	*35.6%*
France	*16.9%*	‘,	*7.1%*
Ireland	*7.0%*	Germany	*5.7%*
Spain	*5.5%*	France	*4.9%*
Germany	*3.8%*	Spain	*3.3%*
Italy	*2.9%*	Belgium	*2.3%*
Austria	*1.9%*	Holland	*2.2%*
Holland	*1.1%*	Italy	*2.2%*
Belgium	*0.9%*	Greece	*1.9%*
Greece	*0.6%*	Sweden	*0.9%*
Poland	*0.5%*	Cyprus	*0.9%*
Cyprus	*0.4%*	Austria	*0.7%*
Sweden	*0.4%*	Poland	*0.5%*
Czech Rep.	*0.4%*	Finland	*0.5%*
Denmark	*0.3%*	Denmark	*0.4%*
Portugal	*0.3%*	Czech Rep.	*0.4%*
Finland	*0.2%*	Portugal	*0.4%*
Luxembourg	*0.2%*	Luxembourg	*0.3%*
Romania	*0.1%*	Romania	*0.2%*
Hungary	*0.1%*	Hungary	*0.2%*
Malta	*0.1%*	Malta	*0.1%*
Slovakia	*0.1%*	Slovakia	*0.1%*
Bulgaria	*0.1%*	Bulgaria	*0.1%*
Latvia	*0.0%*	Latvia	*0.0%*
Estonia	*0.0%*	Lithuania	*0.0%*
Lithuania	*0.0%*	Estonia	*0.0%*
Slovenia	*0.0%*	Slovenia	*0.0%*
United States	*9.2%*	**United States**	*14.5%*
Japan	*6.4%*	**Africa**	*8.4%*
Canada	*5.1%*	**Australia**	*5.2%*
Africa	*5.0%*	**Canada**	*4.0%*
Australia	*4.5%*	**Japan**	*3.1%*
China	*3.9%*	**Switzerland**	*2.9%*
Latin America	*2.9%*	**China**	*2.8%*
Switzerland	*1.9%*	**New Zealand**	*2.5%*
New Zealand	*1.8%*	**Latin America**	*2.3%*
Hong Kong	*1.6%*	**Hong Kong**	*1.3%*
India	*1.3%*	**India**	*0.9%*
Rest of the world	*12.3%*		*16.5%*

Table 7
Descriptive Statistics for Variables included in Regression Analysis
2002/03-2006/07 HEI Graduate Cohorts

Variables		Undergraduate graduates	Postgraduate graduates
	Stayer	*92.4%*	*92.2%*
	National mover	*5.2%*	*5.1%*
	International mover	*2.4%*	*2.6%*
Sex:			
	Male	*40.0%*	*38.8%*
	Female	*60.0%*	*61.2%*
Mode of study:			
	Studied full-time	*85.0%*	*57.9%*
	Studied part-time	*15.0%*	*19.1%*
Disability status:			
	Not disabled (excluded)	*90.8%*	*91.5%*
	Disabled	*6.8%*	*4.5%*
	Disabled missing	*2.4%*	*3.9%*
Ethnicity:			
	White (excluded)	*84.0%*	*81.1%*
	Not white	*12.3%*	*9.7%*
	Ethnicity missing	*3.7%*	*9.2%*
Class of qualification:			
	1st class	*9.1%*	--
	2.1 class	*39.2%*	--
	2.2 class (excluded)	*25.3%*	--
	3rd class/Pass/other	*12.0%*	--
	Class missing	*14.4%*	--
Subject of study:			
	Science	*45.1%*	*31.7%*
	Science-led	*3.0%*	*0.7%*
	Social Science	*22.1%*	*27.3%*
	Social science-led	*2.4%*	*0.3%*
	Interdisciplinary	*1.7%*	*1.3%*
	Arts/Humanities (excluded)	*25.4%*	*38.8%*
	Arts/Humanities-led	*0.4%*	*0.1%*
	Subject missing	*0.1%*	--
Type of institution:			
	Russell group university	*22.3%*	*25.1%*
	Post-1992 university	*39.8%*	*31.2%*
	Old university (excluded)	*25.0%*	*32.9%*
	Specialist HEI	*13.0%*	*10.8%*

Age at graduation:			
	Age < 24 (excluded)	*70.2%*	*23.8%*
	Age 25-29	*10.1%*	*27.6%*
	Age 30+	*19.6%*	*48.7%*
Moved to Study:			
	Yes	*50.0%*	*39.3%*
	No	*50.0%*	*60.7%*
Country of domicile:			
	England (excluded)	*82.9%*	*81.7%*
	Scotland	*8.4%*	*9.6%*
	Wales	*4.9%*	*5.0%*
	Northern Ireland	*3.8%*	*3.7%*
Country of study:			
	England (excluded)	*81.9%*	*82.3%*
	Scotland	*9.3%*	*9.6%*
	Wales	*5.8%*	*5.2%*
	Northern Ireland	*3.0%*	*2.9%*
Cohort:			
	2002/03 (excluded)	*19.7%*	*19.0%*
	2003/04	*20.5%*	*19.4%*
	2004/05	*18.3%*	*18.7%*
	2005/06	*20.8%*	*21.2%*
	2006/07	*20.7%*	*21.6%*

Table 8
Multinomial Regression Results of the Probability of Migrating
2002/03-2006/07 HEI Graduate Cohorts

	Undergraduate graduates		Postgraduate graduates	
Variable	**(1)**	**(2)**	**(3)**	**(4)**
	National mover	**International mover**	**National mover**	**International mover**
Male	*0.125*	*0.252*	*0.169*	*0.492*
	[10.7]	*[17.2]*	*[9.0]*	*[21.0]*
Studied full-time	*-0.091*	*0.199*	*-0.214*	*0.725*
	[3.6]	*[5.0]*	*[8.9]*	*[23.4]*
Disabled	*0.114*	*0.125*	*0.023*	*-0.094*
	[5.2]	*[4.6]*	*[0.5]*	*[1.7]*
Disabled missing	*0.227*	*0.125*	*0.365*	*0.300*
	[4.9]	*[2.1]*	*[7.9]*	*[5.7]*
Ethnicity Non-white	*-0.396*	*-0.354*	*-0.171*	*0.182*
	[15.1]	*[12.6]*	*[4.2]*	*[4.9]*
Ethnicity missing	*-0.028*	*0.155*	*0.232*	*0.232*
	[0.9]	*[3.9]*	*[7.7]*	*[6.4]*
1st class	*0.151*	*0.400*	--	--
	[7.1]	*[15.9]*		
2.1 class	*0.084*	*0.246*	--	--
	[5.8]	*[13.4]*		
3rd class/Pass/other	*-0.342*	*-0.379*	--	--
	[16.3]	*[12.0]*		
Class missing	*-0.490*	*-0.594*	--	--
	[19.2]	*[14.6]*		
Science	*0.107*	*-0.614*	*0.694*	*0.358*
	[7.3]	*[33.5]*	*[30.8]*	*[12.2]*
Science-led	*0.084*	*-0.376*	*0.894*	*0.298*
	[2.3]	*[8.8]*	*[8.8]*	*[2.2]*
Social Science	*-0.024*	*-0.382*	*0.299*	*0.420*
	[1.4]	*[18.9]*	*[11.6]*	*[13.4]*
Social Science-led	*0.086*	*0.291*	*1.061*	*0.800*
	[2.4]	*[8.7]*	*[7.1]*	*[4.9]*
Interdisciplinary	*0.397*	*0.165*	*0.315*	*0.551*
	[6.9]	*[2.6]*	*[2.5]*	*[5.1]*
Arts/Humanities-led	*0.116*	*-0.069*	*-0.720*	*0.233*
	[1.2]	*[0.6]*	*[1.2]*	*[0.5]*
Subject missing	*-0.810*	*1.019*	--	--
	[1.4]	*[3.0]*		
Russell group university	*0.066*	*0.237*	*0.098*	*0.128*
	[4.5]	*[13.4]*	*[4.3]*	*[4.9]*
Post-1992 university	*-0.200*	*-0.639*	*-0.251*	*-0.879*
	[12.5]	*[30.9]*	*[9.2]*	*[24.8]*
Specialist HEI	*0.071*	*-0.687*	*0.259*	*-0.846*
	[3.5]	*[23.6]*	*[7.7]*	*[15.7]*
Age at graduation 25-29	*-0.037*	*-0.093*	*0.099*	*0.643*

	[1.7]	*[3.2]*	*[3.9]*	*[21.0]*
Age at graduation 30+	*-0.242*	*-0.763*	*-0.039*	*0.267*
	[10.6]	*[21.0]*	*[1.4]*	*[7.7]*
Moved to study	*2.462*	*0.531*	*2.194*	*0.451*
	[125.4]	*[31.8]*	*[88.2]*	*[19.1]*
Scotland-domiciled	*-0.470*	*-0.439*	*0.203*	*-0.111*
	[18.2]	*[10.3]*	*[5.3]*	*[1.7]*
Wales-domiciled	*1.076*	*-0.249*	*0.752*	*-0.288*
	[52.6]	*[5.9]*	*[22.3]*	*[3.7]*
Northern Ireland-domiciled	*2.095*	*1.267*	*1.742*	*0.987*
	[68.3]	*[25.4]*	*[37.5]*	*[12.7]*
Studied in Scotland	*2.472*	*0.899*	*1.709*	*0.031*
	[108.0]	*[23.9]*	*[47.4]*	*[0.5]*
Studied in Wales	*3.345*	*0.589*	*3.135*	*0.332*
	[211.4]	*[16.6]*	*[104.7]*	*[4.4]*
Studied in Northern Ireland	*-1.237*	*-0.883*	*-0.572*	*-0.850*
	[27.4]	*[14.7]*	*[9.3]*	*[8.9]*
2003/04	*0.021*	*-0.113*	*0.008*	*-0.027*
	[1.2]	*[5.0]*	*[0.3]*	*[0.7]*
2004/05	*-0.034*	*-0.110*	*-0.012*	*0.020*
	[1.9]	*[4.8]*	*[0.4]*	*[0.6]*
2005/06	*-0.046*	*-0.048*	*-0.059*	*0.049*
	[2.5]	*[2.2]*	*[2.0]*	*[1.3]*
2006/07	*-0.055*	*-0.081*	*-0.057*	*0.033*
	[3.0]	*[3.6]*	*[2.0]*	*[0.9]*
Constant	*-5.68*	*-3.72*	*-5.49*	*-4.91*
	[146.3]	*[75.8]*	*[113.1]*	*[88.5]*
N	*837,279*		*306,924*	
Log likelihood	*-202,010*		*-79,190*	
Pseudo R^2	*23.6%*		*20.0%*	
Notes: Ratio of coefficient to its standard error in parentheses				

Table 9
Predicted Migration Probabilities

(a) Undergraduate graduate	Graduate A	Graduate B	Absolute difference	Percentage difference
Stayer	*92.4%*	*82.8%*	*-9.7%*	*-10.4%*
National mover	*5.2%*	*11.7%*	*6.5%*	*126.2%*
International mover	*2.4%*	*5.6%*	*3.1%*	*130.2%*
(b) Postgraduate graduate	**Graduate A**	**Graduate B**	**Dif**	**%dif**
Stayer	*92.2%*	*81.5%*	*-10.7%*	*-11.6%*
National mover	*5.1%*	*13.2%*	*8.1%*	*157.4%*
International mover	*2.6%*	*5.3%*	*2.7%*	*101.4%*

Note:
See text for further details.
Graduate A = mean values of variables
Graduate B = white, non-disabled, male, who studied full-time and graduated between the ages of 20 and 24 with a science qualification from a Russell Group university that he moved to in order to study.