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Economic perspectives

Graduate migration flows in Scotland*

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Abstract:

This paper examines the nature of graduate migration flows in Scotland. Migration equation is 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 (HESA). The probability of migrating from Scotland is related to a set of observable characteristics. These logit regressions are estimated separately for Scotland-domiciled and rest-of-the-UK domiciled graduates and separately for under-graduates graduates and postgraduate graduates. The analysis suggests that migration is a selective process with what can be termed “high achievers” having a higher probability of leaving Scotland after graduation.

1. 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 stay 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. In order to evaluate the impact that the higher education sector makes on regional economies, it is necessary to estimate the value of human capital generated by the higher education sector along with its regional distribution. One way of achieving this is to consider the regional movement of graduates in an analogous way to the importing and exporting of goods and services.

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Opinions expressed in economic perspectives are those of the authors and not necessarily those of the Fraser of Allander Institute

Figure 1: Net-migration, Scotland, 1951-2007

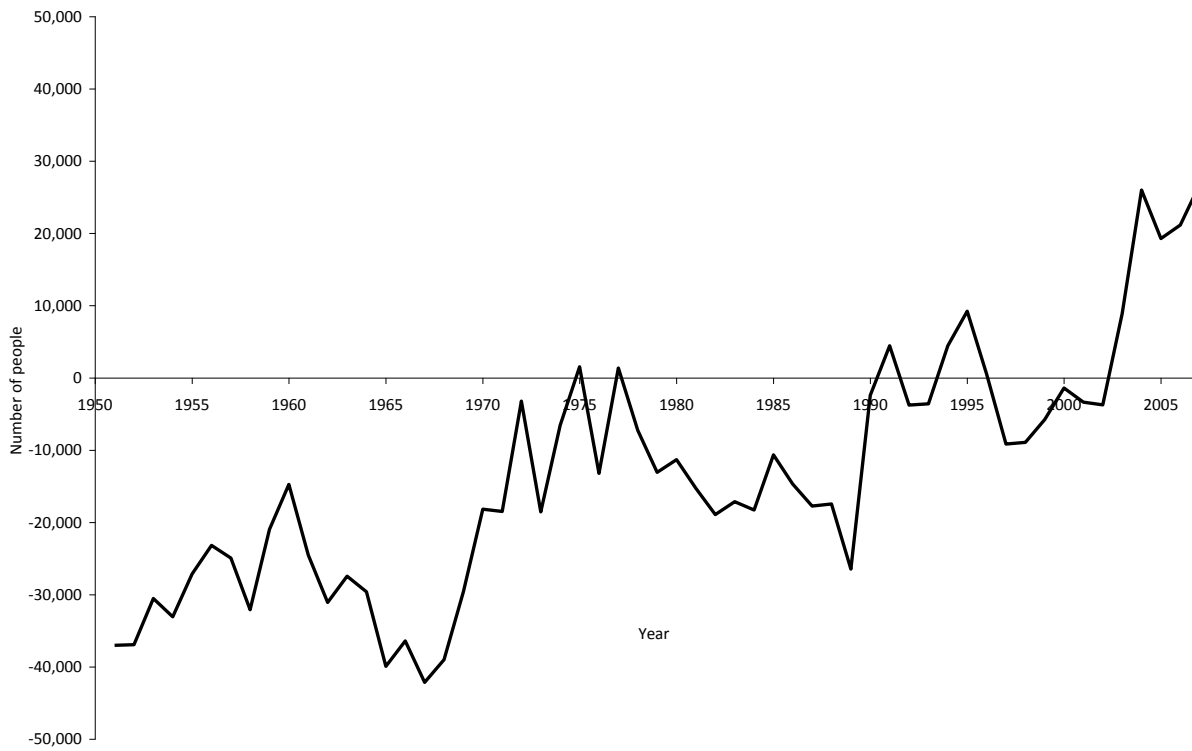
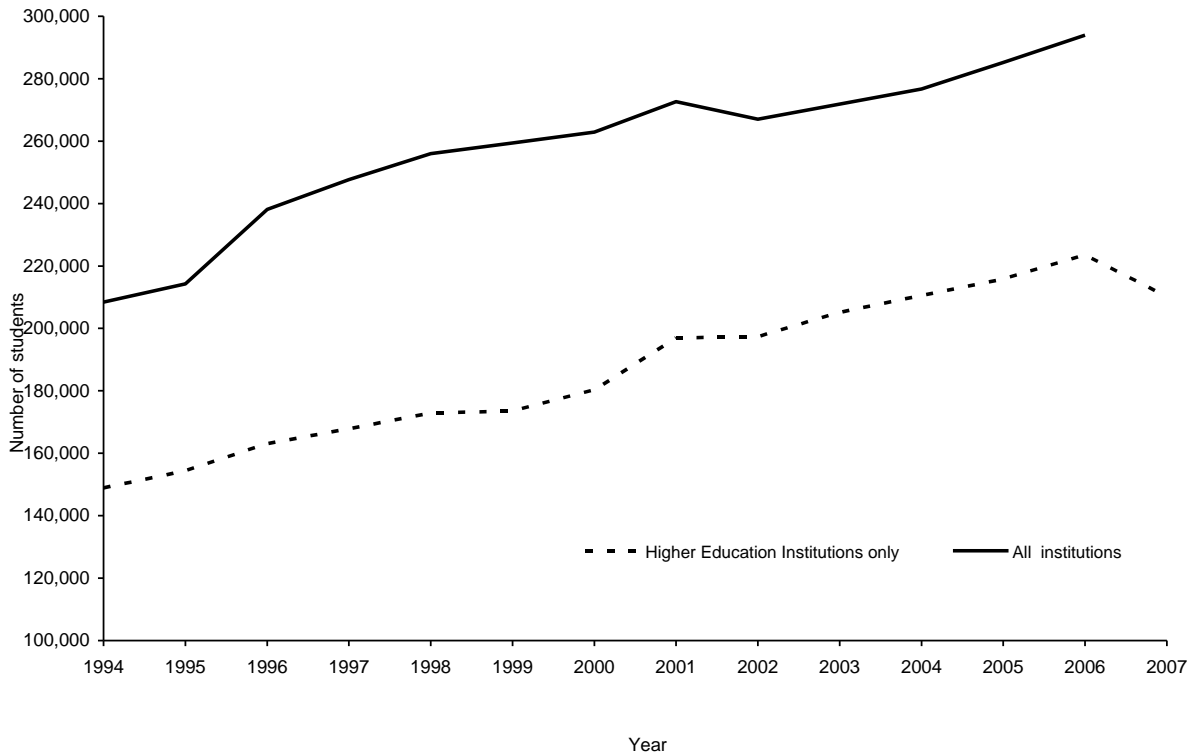


Figure 2: Number of Higher Education Students, Scotland, 1994/95-2007/08



Using this analogy, Scotland has traditionally been a net-exporter of people. Throughout most of the post-war period, the number of emigrants has exceeded the number of immigrants by a sizeable amount (see Figure 1). In the period 1950 to 2000, total net-migration was over 800,000 people, which is a staggering figure remembering that the overall population of Scotland hovered around 5 million in most of this period. However, in the past few years, net-migration has been positive spurred on by a large flow of migrants from the mostly Central European countries that joined the European Union in 2004 (Wright, 2008). A key question is whether these large flows will continue into the future?

There is a widely held concern over the trend of depopulation of Scotland especially in the rural and remote regions. Given the belief that migration flows of graduates might reinforce migration flows of general population, one argument is that the establishment of Further and Higher Education institutions in remote regions will help reverse this trend. Therefore the issues of which factors and to what extent each of these factors determines the migration behaviour of graduates have clear implications for policy making (especially in terms of the retention of Scottish higher education graduates). With this background in mind, the purpose of this paper is to examine the out-migration of higher education graduates from Scotland.

2. Higher education trends

According to the Scottish Government (2008), in the academic year 2005/06 (the most recently available estimate) there were 308,085 higher education students in Scotland. Of this total, 244,510 (79.4 per cent) studied at Higher Education Institutions (HEIs); 49,460 (16.1 per cent) studied at Colleges of Further and Higher Education; and 14,155 (4.6 per cent) were enrolled on courses offered by the Open University.¹ It is not surprising that the majority of students studying in Scotland—around 70 per cent—are “Scotland-domiciled” meaning that their “normal residence” is in Scotland. Although the match is not perfect, this implies that most Scotland-domiciled students received at least some of their secondary schooling in Scotland.

It is clear that the number of students participating in higher education has increased over the past two decades in Scotland. Figure 2 shows the number of higher education students from 1994 onwards, excluding Open University students. The trends for “all” higher education students and HEIs-only students are shown. Over this period there has been a gradual increase in the relative share of HEIs-only students, from 71.4 per cent in 1994/05 to 76.0 per cent in 2006/07. The estimate of the total number of higher education students for 2007/08 is currently not available. However, according to data published by the Higher Education Statistical Agency (HESA), which is the official agency for the collection, analysis and dissemination of quantitative information about higher education in the UK, it appears that the number of HEIs-only students fell between 2007/08 and 2006/07 by about 13,000. Our analysis

suggests this drop is mainly due to a decrease in Scotland-domiciled and foreign (non-UK) students. The decrease in Scotland-domiciled students is likely explained by the decrease in higher education participation rates since their peak around 2001/02 (see Figure 3).

Despite this recent decrease, longer-term growth across all student groups has been impressive. Evidence in support of this claim is shown in Table 1. This table gives the growth rates of various student groups between 1994/95 and 2007/08 for Scotland and for the UK as a whole. However, the HESA estimates refer to HEIs-only students. The increase in the total number of students in this period was 41.2 per cent, which is lower than the average for the UK of 47.1 per cent. As the table shows, the difference is largely accounted for by a lower growth rate for full-time under-graduates in both science and non-science subjects. The growth rate in foreign and post-graduate students equalled the rate for the UK. However, the growth in part-time students was nearly 50 per cent higher than the UK average, suggesting that much of the increase can be accounted for by this group. Although Scotland performance in increasing student numbers has been below that of the UK as whole, it must be remembered the Scotland-domiciled individuals throughout this period had much higher rates of participation in higher education compared to other countries of the UK, although the gap is closing. In this sense, Scotland started out from a “higher base” in the beginning of this period, so these slightly lower growth rates should not be interpreted as Scotland not being able to keep up.

Figure 4 shows the number of higher education graduates expressed per 1,000 population in Scotland and the UK for the same period. When population size is used to deflate these student numbers, Scotland is performing above the average for the United Kingdom. For example, in 1995, there were about 29 students per 1,000 population in Scotland and 27 students per 1,000 population in the UK as a whole. By 2007, this had risen to 43.5 per 1,000 in Scotland and 38 per 1,000 in the UK. It is worth mentioning that the Scottish rate is currently about the same as in Wales (44.2 per 1,000) but considerably higher than in England (38.3 per 1,000) and especially Northern Ireland (23.6 per 1,000).

As mentioned above, the majority of students studying at Scottish institutions of higher education are Scotland-domiciled. Table 2 gives the breakdown of HEIs-only students for 1994/05 and 2007/08 while Figure 5 shows the trends in England-domiciled, Northern Ireland-domiciled, Wales-domiciled and foreign-domiciled students. It is interesting to note that the number of students domiciled elsewhere in the UK, both in absolute numbers and relative shares has changed little in this period. However, in this period, there has been a doubling of the number of foreign-domiciled students studying in Scotland, with their share of the total rising from 11.4 to 16.1 per cent.

Figure 3: Higher education age participation index Scotland, 1983/84 to 2006/7

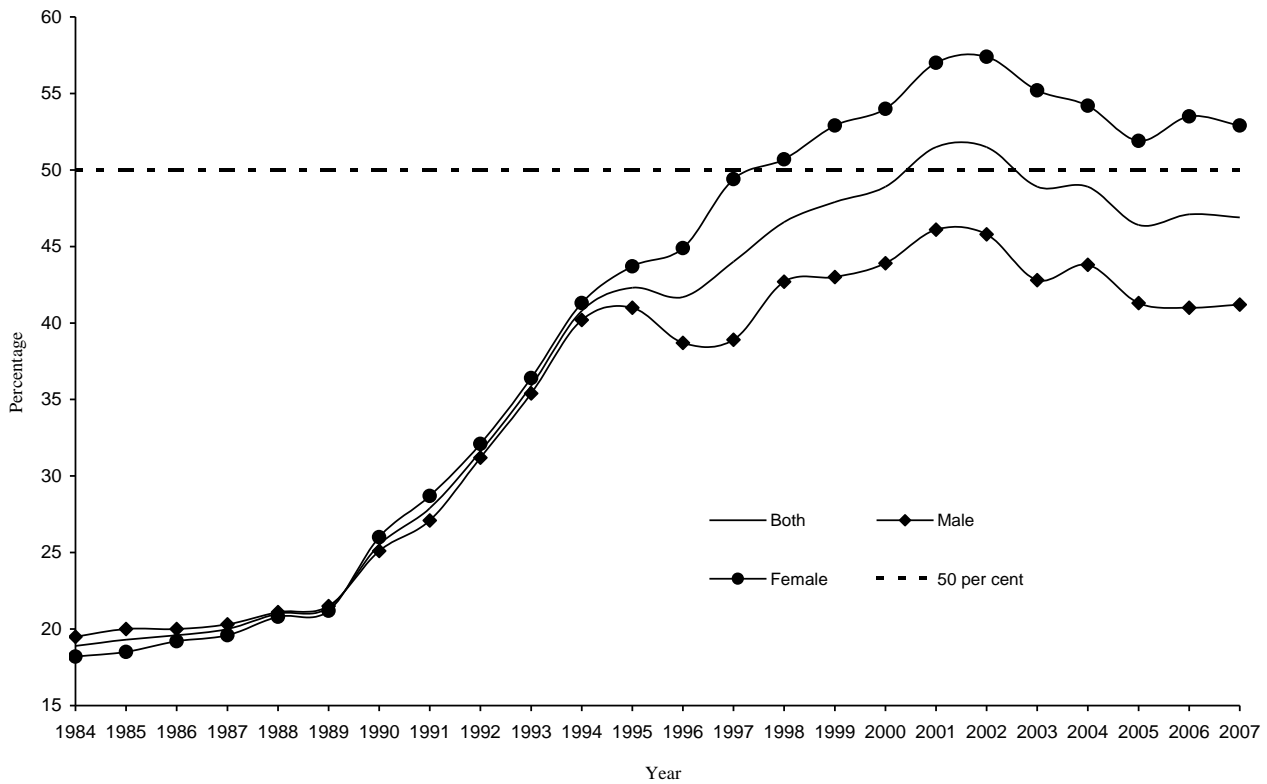


Figure 4: Higher education students per 1,000 population, Scotland and UK, 1994/95-2007/08

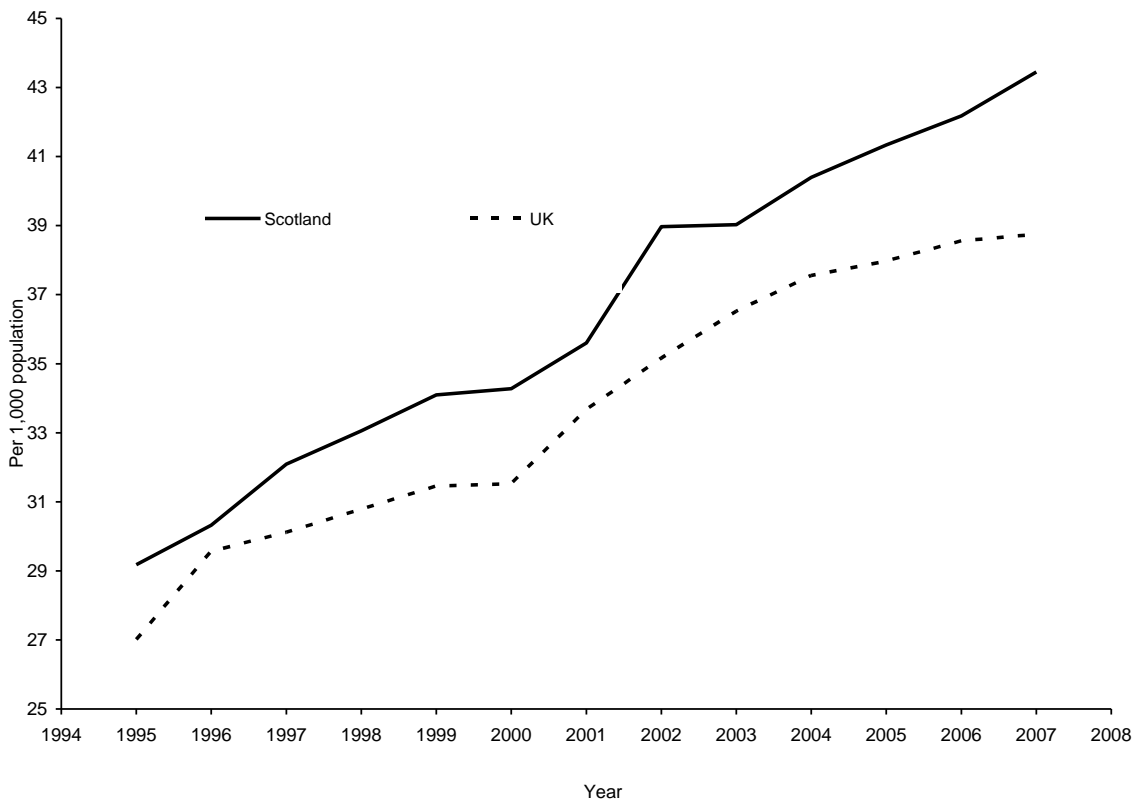
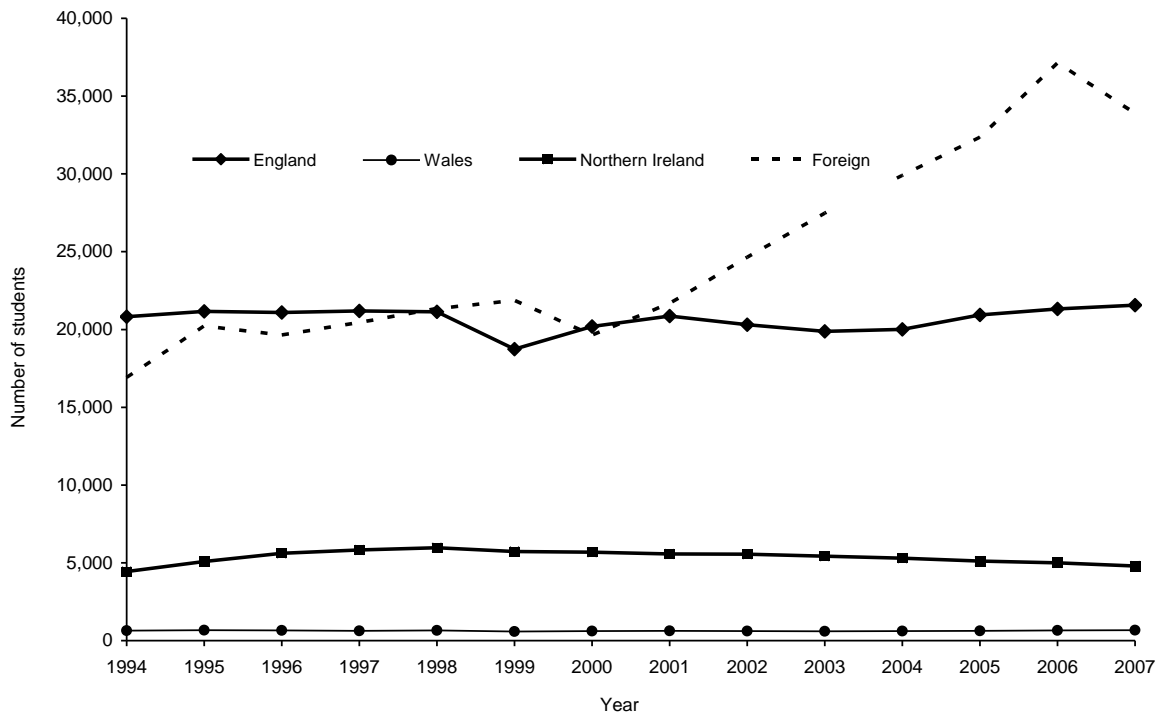


Figure 5: Place of domicile of non-Scotland-domiciled Students in Scottish higher education insitutions, 1994/95-2007/08



3. Micro-data analysis

About 30 per cent of higher education students in Scotland are rest-of-the-UK or foreign- domiciled, with the split between these two groups being roughly equal (see Table 2). In this sense, it seems fair to conclude that Scotland is successful at attracting students in highly competitive national and international markets. Although the attraction of students is important, one can argue that their retention is even more important, particularly when viewed against the background of demographic decline mentioned above (see Lisenkova and Wright 2009 for a more thorough discussion). In this sense, it is important to identify what are the key factors affecting the migration decisions of graduates.

In order to examine the determinants of graduates' migration choices, we employ the micro-data collected by HESA for subsequent analysis. More specifically, information has been combined from two main data-bases—(1) Destinations of Leavers from Higher Education Institutions; and (2) Students in Higher Education Institutions—for five cohorts of graduates, covering the period 2002/03 to 2006/07. In this merged data-set, there are three key postal addresses of interest: (1) place of domicile; (2) place of study; and (3) place of employment six months after graduation. With these postal addresses 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.

A series of migration equations have been estimated building on the earlier studies of Faggian and McCann (2006) and Faggian, McCann and Sheppard (2006, 2007a, 2007b). In these equations, the probability of leaving Scotland after graduation is related to a set of observable characteristics with logit regression. The variables considered include: gender, ethnicity, age, mode of study, field of study, class of degree, type of higher education institution attended and whether the individual moved from their region of domicile to study, which are described in more detail in Table 3. These equations are estimated separately for “under-graduate” and “post-graduate” graduates and for various places of domicile. HESA does not collect information of this type for foreign-domiciled graduates or for UK-domiciled graduates who migrate abroad. The details relating to the estimation of these equations, along with a full set of results, can be found in our companion paper (Faggian, Li and Wright, 2009)

In general our analysis suggests that the probability of leaving Scotland after graduation is strongly correlated with certain characteristics. With respect to Scottish-domiciled under-graduate graduates, the probability of leaving Scotland is higher for men than women. It is higher for those who studied full-time compared to part-time. Age is important but its effect is non-linear—“younger” and “older graduates” both have lower probabilities of migrating after graduation. There are also differences relating to ethnicity

There are two main regional effects. The first is that students who moved away from their “region” of domicile

Table 1: Percentage growth rates of various higher education student groups, 1994/95-2007/08

Type of Student:	Scotland	UK
Full-time	26.2	37.5
Part-time	99.6	68.3
Under-graduates	38.1	46.5
Post-graduates	51.5	49.4
Foreign	100.4	108.8
Science	55.7	66.4
Non-science	30.3	36.2
All students	41.2	47.1

Source: Higher Education Statistical Agency

Table 2: Place of Domicile of Students at Scottish Higher Education Institutes, 1994/05 and 2007/08

Place of domicile	1994/05		2007/08	
	Numbers	%	Numbers	%
Scotland	103,426	69.5	148,460	70.6
England	20,819	14.0	21,560	10.3
Northern Ireland	4,443	3.0	4,800	2.3
Wales	645	0.4	675	0.3
Foreign	16,915	11.4	33,895	16.1
Missing	2,660	1.8	795	0.4
All	148,908	100	210,185	100

Source: Higher Education Statistical Agency

to study (with regions being defined as shown in Table 3), have a higher probability of leaving Scotland after graduation. The second is that those who studied at a HEI in the Strathclyde region have a lower probability of leaving. Finally, those who graduated with a first class science degree from a Russell Group university also have a higher probability of migrating.

Although many of these factors are significant in a traditional statistical sense, the next issue to consider is how “big” are these effects? One way to attempt to answer this is to use the migration equations to “predict” the probability of migrating based on a set of specific characteristics and compare this to the average probability. The raw data suggest that in the five-year period covered by our data, the “average” probability of leaving Scotland after graduation was 4.6 per cent. The estimates suggest that the predicted probability of migrating for under-graduates who are white males, who studied full-time and graduated with a first class science degree from a Russell Group university, at age 22 is 21.5 per cent. By any standards, such individuals are “high achievers”, and it must be worrying that there is a propensity for one-in-five to leave Scotland after graduation.

The results for England-, Northern Ireland- and Wales-domiciled under-graduate graduates are less pronounced. There is no difference between men and women, although those who studied full-time have a lower probability of leaving Scotland after graduation. There is clearer gradient with age suggesting that the individuals who are older at graduation have lower higher probability of leaving. There is little difference by ethnicity. Likewise degree classification is not important except those with degree classification missing have a lower probability of leaving. Students graduating with science or science-led combined degrees have a lower probability of migrating. Finally, there is little difference between England- and Wales-domiciled students. However, the probability of leaving Scotland after graduation is considerably lower for Northern Ireland-domiciled students.

The raw data indicate that the “average” probability of leaving Scotland after graduation for this group was 58.9 per cent. It is of course not surprising that this rate of migration is much higher than for Scotland-domiciled students. If we consider the same “hypothetical individual” as discussed above, the differences associated with the variables included in the migration equation is not as marked as what was found for Scotland-domiciled students. The estimates suggest that the predicted

Table 3: Variables Included in migration equations

<p>(1) Sex</p> <p>(2) Age at graduation</p> <p>(3) Ethnic group:</p> <ol style="list-style-type: none"> 1. White 2. Black 3. Asian 4. Mixed-White and Black 5. Mixed-White and Asia 6. Mixed-Other 7. Other or Unknown <p>(4) Class of degree</p> <ol style="list-style-type: none"> 1. 1st 2. 2-1 3. 2-2 4. 3rd & Pass 5. Other <p>(5) Subject area</p> <ol style="list-style-type: none"> 1. Arts and Humanities 2. Social Science 3. Science 4. Joint: Arts and Humanities-led 5. Joint: Social Science -led 6. Joint: Science-led 7. Unknown 	<p>(6) Type of HEI</p> <ol style="list-style-type: none"> 1. Further/Higher College 2. Post-1992 university 3. Non-Russell group pre-1992 university 4. Russell Group university <p>(7) Region of domicile</p> <ol style="list-style-type: none"> 1. Strathclyde 2. Dumfries and Galloway 3. Borders 4. Lothian 5. Central 6. Fife 7. Tayside 8. Grampian 9. Highland 10. Western Isles <p>(8) Studied full or part-time</p> <p>(9) Movers i.e. region of domicile is not region of HEI attended as in (7)</p>
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probability of migrating for under-graduates who are white males, who studied full-time and graduated with a first class science degree from a Russell Group university, at age 22 is 62.4 per cent. This is only a few percentage points higher than the average. More generally, the results suggest that the key factors that are likely driving the migration decisions amongst this group are not included in the model.

4. Concluding comments

The statistical modelling suggests that the out-migration of graduate is a selective process with what can be termed “high achievers” having considerably higher probabilities of leaving Scotland after graduation for other regions of the UK (mainly income). The data suggest that in 2006/07, about 12.1 per cent of graduates of Scottish HEI’s had migrated to somewhere else in the UK within six months of graduation. 87.6 per cent of this total had migrated to England. However, while this out-migration can be considered a “loss” to Scotland, it must be remembered that Scotland also attracts graduates

from the other countries of the UK and from abroad. Although the HESA data are of little practical use in the analysis of the migration flows of foreign-domiciled graduates, other data sources as well as applications to the so-called Fresh Talent Initiative suggest that a sizeable number of such graduates, at least for a short period of time, stay in Scotland (see Rogerson, Boyle and Mason, 2006). While Scotland clearly loses graduates it also gains graduates and what is important in the net position. What is not clear is whether or not Scotland gains more than it loses because of graduate migration flows. Analysis along the lines carried out in this paper should be able to provide at least a partial answer to this question.

One weakness with our analysis is that the place of employment is measured only six months after graduation. It is often argued that it takes much longer for graduates to establish themselves in the labour market. This is used by many to explain what appears to be the high level of “over-education” six months after graduation, with over-education being measured by the proportion of graduates being employed in so-

called “non-graduate jobs”. This suggests that many of the moves may very well be short-term in nature, with the individual moving again in order to obtain a “graduate job”. Criticisms along these lines suggest that much could be learned about migration patterns by considering the situation several years after graduation.

Fortunately data of this type have recently been collected as part of HESA’s Destinations of Leavers from Higher Education Longitudinal Survey. In this survey the 2002/03 cohort of graduates were interviewed 3½ years later (i.e. in the winter of 2006/07). The descriptive analysis of the data carried out by National Centre for Social Research suggests there are key differences between what is observed six months after graduation compared to 3½ years after graduation (HESA, 2007). We believe that the analysis of this Longitudinal Survey should be a useful addition to extend current investigation and thus is a future avenue to pursue in our subsequent research.

Endnotes

1. The current list of Scottish HEIs is:

Edinburgh Napier University
Glasgow Caledonian University
Glasgow Graduate School of Law
Glasgow School of Art
Heriot-Watt University
Open University in Scotland
Queen Margaret University
Robert Gordon University
Scottish Agricultural College
University of Aberdeen
University of Abertay Dundee
University of Dundee
University of Edinburgh
University of Glasgow
University of Saint Andrews
University of Strathclyde
University of Stirling
University of the West of Scotland
UHI Millennium Institute

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