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University pathways of urban and rural migration in Iceland

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University pathways of urban and rural migration in Iceland

Abstract

Low levels of education have serious social, economic and cultural ramifications in rural areas. In many countries, regional universities have explicitly been built to educate the local population, create professional jobs and stimulate innovation. More recently, distance education has been developed to provide university education in rural regions and diminish brain drain towards urban centres. In this study, the pathways of Icelandic university graduates are traced from place of origin to residence five years after graduation. An overwhelming majority of local students at the national University of Iceland (UI) remain in the Reykjavík Capital Area after graduation, while others mostly emigrate abroad. Only about one in three UI students from regions beyond commuting distance return after graduation, while about half remain in the capital area and others mostly emigrate. The regional University of Akureyri (UNAK) in Northern Iceland is relatively successful in retaining graduates from North Central region, but on-campus students from regions beyond commuting distance from UNAK are no more likely to return after graduation than their UI counterparts. In sharp contrast, about three in four UNAK distance students remain in their region of origin after graduation. While regional universities may primarily strengthen regional centres, distance education has the potential to enhance educational levels in more distant exurban, micropolitan and rural areas.

Keywords

Universities, distance education, migration, mobility, Iceland

1. Introduction

Inequalities in higher education contribute to regional and rural decline by drawing students from local communities and preventing the return of college graduates. In most countries, the level of university education is highest in the largest cities and decreases with less urbanization and more distance from cities and universities (OECD, 2016). Educational opportunities are generally concentrated in urban areas and successful professional careers are in most cases best pursued in metropolitan or even global job markets. This may of course vary by fields of study and professional specialisation, as school teachers and general practitioners may for instance have a broader choice of professional locations than corporate lawyers and nuclear scientists. Social mobility nevertheless frequently presupposes geographical mobility, and greater educational and occupational aspirations consistently predict stronger migration intentions among rural youth (Bjarnason and Thorlindsson 2006; Elder, King and Conger, 1996; Rye, 2011; Seyfrit, Bjarnason and Olafsson, 2010; Thissen et al, 2010).

Prospective university students from rural areas may have various plans for future residence that do not necessarily come to fruition. Many are drawn by an ‘urban ethos’ or ‘cosmopolitanism’ that equates city life with a free, modern lifestyle and may have firm plans of never returning (Bjarnason, 2014; Gabriel, 2002; Lowe, 2015; Skrbis, Woodward and Bean, 2014). Others have a strong attachment to the local community and may choose to pursue studies that might enable them to return upon graduation or later in life (McLaughlin, Shoff and Demi, 2014; Rérat, 2014; Thissen et al, 2010). Various changes over the life course may affect such early plans, including romantic relationships and joint decision making of spouses (Clerge et al, 2017; Costa and Kahn, 2000). The aggregate level of adolescent migration intentions is nevertheless a fairly strong predictor of rural population development in the following decades (Bjarnason, 2014).

The concentration of university graduates in urban and metropolitan areas contributes to increased productivity, innovation and entrepreneurship, and helps create dynamic environments rich in amenities and occupational opportunities (Blackwell, Cobb and Weinberg, 2002; Gunasekara, 2006; OECD, 2016; Pink-Harper, 2015). Such urban and metropolitan areas are in turn characterized by low out-migration and high in-migration of university graduates (Abel and Deitz, 2012; Edvardsson, 2014; Gottlieb and Joseph, 2006; Waldorf, 2009; Winters, 2011c). Conversely, the lack of a university educated workforce in rural areas is a self-reinforcing process with serious social, economic and cultural

ramifications. The lack of university education in communities traditionally dependent on primary and secondary production inhibits successful local innovations and entrepreneurship, and may reduce the chances of outside investments that require an educated workforce. The lack of university graduates also adversely affects various amenities and services, including health services, education, cultural activities and recreational opportunities (Chatterton, 2000; Corcoran, Faggian and McCann, 2010; Winters, 2011b). Ironically, in more rural areas it is therefore often difficult to fill the relatively few existing jobs for university graduates such as teachers, doctors, nurses, psychologists and social workers (Flum et al., 2016; Jervis-Tracey, 2016; Kelly and Fogarthy, 2015; Mbemba, Gagnon and Hamelin-Brabant, 2016; Nithiapinyasakul, Arora and Chamnan, 2016; Reid et al., 2010; Reininger, 2012).

Governments in many Western countries have attempted to break this vicious circle by placing regional institutions of higher education at the centre of regional policy (Anderssen, Quigley and Wilhelmsson, 2004, Arbo and Eskelinen, 2003, Edvardsson, 2001; Frenette, 2009; Lehmann, et al., 2009; Tomaney and Wray, 2011). Regional universities are in particular expected to have a wide range of positive regional impacts, including the diversification of industries, provision of skilled jobs, consumption of goods and services, support of innovation and entrepreneurship, and collaboration with local actors for regional development (Breznitz and Feldman, 2012; Drucker and Goldstein, 2007; Edvardsson, 2014; Scott, 2014; Smith and Bagchi-Sen, 2012). Most importantly, regional universities are expected to enhance regional levels of higher education by producing university graduates, recruiting educated faculty and staff and creating an intellectual and cultural context that draws other educated people to the area (Abel and Deitz, 2012; Blackwell, Cobb and Weinbert, 2002; Bramwell and Wolfe, 2008; Gottlieb and Fogarty, 2003). It should however be noted that the regional impact of universities tends to be geographically limited (Anderssen, Quigley and Wilhelmsson, 2004, 2009). The economic impact is primarily felt in their immediate vicinity and they do not necessarily enhance educational levels in more peripheral areas. Regionally they may even contribute to economic and cultural centralization at the expense of the regional periphery (Edvardsson, 2014; Goldstein and Glaser, 2012; Nord and Weller, 2002). While the establishment of regional universities may be an important part of a broader strategy for strengthening major regional centres, they may therefore not necessarily increase the level of university education in smaller towns or more rural areas.

More recently, the development of online distance education has been widely hailed as an effective way of providing university education in rural regions and diminishing brain drain

towards urban centres (e.g. Chawinga and Zozie 2016; Muhirwa, 2012; OECD, 2015; Rennie, Johannesdottir and Kristinsdottir, 2011; Tomaney and Wray, 2011; UNESCO, 2015). The advancement of information technology has revolutionised teaching and learning as new technology enables the exchange of ideas and teaching material, free of the constraints of time and space. Distance education clearly makes university education more accessible to prospective rural students and thus decreases inequalities in individual access to higher education. It is however unclear to what extent distance education increases the educational levels of rural populations. Many distance education graduates inevitably move to urban areas and distance education may to some extent simply delay out-migration by the duration of the studies. Somewhat surprisingly, there is a lack of research on the effects of distance education on the residential choices of university graduates and its impact on levels of higher education in rural areas.

In this paper, we explore the influence of on-campus and distance higher education on the future migration of Icelandic university students. The pathways of all graduates between metropolitan, exurban, micropolitan and rural areas are mapped over a ten year frame through the national University of Iceland in the capital of Reykjavík and on-campus and distance education at the regional University of Akureyri in the regional centre of Northern Iceland. A multinomial logistic regression model is then developed to estimate the association of gender, general area of study, university location and distance education with migration to different domestic and international destinations.

2. Pathways of higher education

The impact of university education on migration is the outcome of complex interactions between communities of origin, the location and relative strength of universities, individual educational choices and aspirations, social networks and interpersonal relations, and structural and individual occupational opportunities.

University enrollment and choice of university depend on a whole host of factors ranging from structural characteristics such as gender (Buchmann, 2009; Reynolds and Burge, 2008; Wells, Seifert and Saunders, 2013), race and ethnicity (Alvarado and Turley, 2012; Griffin et al., 2012; Kim and Nunez, 2013), and social class (Deil-Amen and Tevis, 2010; Goyette, 2008; Rye, 2011; Wu and Bai, 2015) to attachment, relations and advice from family and friends (Alvarado and Turley, 2012; Myers and Myers, 2012; Wells, Seifert and Saunders,

2013), and individual values, aspirations and ambitions (Goyette, 2008; Sojken, Bartkowiak and Skuza, 2012; Wu and Bai, 2015).

While the university preferences of students may be influenced by e.g. the course offerings, reputation and tuition levels of different institutions (Cooke and Boyle, 2011; Tindal det. al., 2015; Walsh et al., 2015; Sojken, Bartkowiak and Skuza, 2012), selective universities may also choose among applicants on the basis of social and economic background, test scores and educational achievement, and even interests and extracurricular activities (Deil-Amen and Tevis, 2010; Dwenger, Storck and Wrohlich, 2012; Klasik, 2012).

Importantly for the purposes of the current study, geography is one of the factors influencing the choice of university. University enrollment decreases with increased distance from university (Alm and Winters, 2009; Frenette, 2009; Jepsen and Montgomery, 2009; Kjellström and Regnér, 1999; Parker et al., 2016; Spiess and Wrohlich, 2010). Proximity to university has in particular been found to affect the intention to enroll and the actual university enrollment among young people of lower socioeconomic background (Christie, 2007; Frenette, 2009; Parker et al., 2016). Interestingly, local universities do not only draw young people from their areas of origin but also appear to encourage young people to attend more distant universities (Frenette, 2009). The effects of distance on university attendance is however contingent upon e.g. the structure and availability of educational programs, the difficulty of terrain and access of prospective students to car or other means of transportation (Edvardsson and Oskarsson, 2008; Parker et al., 2016).

After completing a university degree, there are various possible pathways between region of origin, region of study and region of destination after graduation (Haapanen and Tervo, 2012; Hoare and Corver, 2010; Venhorst, 2013). Those who move beyond their home region to study have the options of returning home, staying in the region of the university or moving onward to other regions. From the perspective of each region, however, the population of university graduates living in the region can be divided into those who studied locally, local students who moved away for studies and returned to the region with a degree; in-migrant students who moved to region to attend university and stayed after graduation, and in-migrants who only moved to the region after graduation from a university outside of the region. Such outcomes may of course be moderated by factors such as e.g. work and other experience before studies, duration and continuity of study, field of study and academic success, and career trajectories after graduation.

Research in Australia, Britain and the US suggest that on a national level, 75–90% of local university graduates continue to live in the area of origin after graduation (Blackwell, Cobb and Weinberg, 2002; Corcoran, Faggian and McCann, 2010; Hoare and Corver, 2010). In the United Kingdom, the 88% of local London students remaining in the city after graduation was similar to the proportion local students remaining in other regions (Hoare and Corver, 2010). In Finland, however, about 90% of local Helsinki students still lived in the city five years after graduation, compared to only 61% of local students studying in other regions (Haapanen and Tervo, 2012). In contrast, over 70% of London residents who study elsewhere return to the city after graduation, compared to 36–55% in other regions (Hoare and Corver, 2010). Similarly, about 72% of Helsinki students who went to university elsewhere had returned five years later, compared to 37% of other students returning to their home regions.

In-migrant university students in many cases continue to live in the region of the university after graduation (Krieg, Theobald and Goldhaber, 2016; Ricketts, 2013; Venhorst, 2013). In fact, such in-migration may account for the observed association between educational levels and population growth on the regional level (Winters, 2011a). The proportion of in-migrants remaining after graduation does however appear to differ substantially between countries. Between one in four and one in five in-migrant students continued to live in England and Wales after graduation (Hoare and Corver, 2010). Similarly, one in four in-migrant students at Xavier University in the United States stayed in the wider region of the university after graduation (Blackwell, Cobb and Weinberg, 2002). In contrast, between two in five and three in five in-migrant students stay in Scotland and Northern Ireland after graduation.

3. Iceland as a setting of study

Iceland has a small population of about 330 thousand inhabitants on an island of 103,000 km². The population of Iceland is thus for instance only about 0.4% of the German population while the island itself is just over a quarter of the landmass of Germany. Most of the island is however uninhabited with settlements primarily in the peninsulas and inland fjords and valleys of the roughly 5.000 km coastline.

Figure 1 about here

About 64% of the Icelandic population lives in the southwest Capital Area of Reykjavík and an additional 16% in the exurban region within one hour commuting distance from Reykjavík (Statistics Iceland, 2017a). The remaining 20% of the population live in towns, fishing villages and farms around the coast. The northern regional centre of Akureyri (pop. 18.000) and neighboring communities in the micropolitan North Central area (pop. 10.000) account for about a third of the population outside the southwest urban and exurban regions.

There are seven institutions of higher education in Iceland, including four state universities and three private universities supported by the state (see Eurydice, 2017). The state universities are open to all prospective students who have completed post-secondary school and charge only registration fees, while the private universities may have more selective enrollment and charge tuition. Overall, 74% of all university students in Iceland are at the bachelor's level, 23% are at the master's level and 3% are at the doctoral level (Statistics Iceland, 2017e). A bachelor's degree requires three years of full-time study, a master's degree four years of full-time study and depending on discipline a doctorate requires three to four years of full-time.

Levels of higher education have risen substantially in recent decades, in particular in more urban areas and among women. About 38% of the Capital Area population aged 25–64 has completed a university degree, compared to 22% of the same age groups in other regions. In the country as a whole, 38% of all women in these age groups have completed a university degree compared to 26% of all men. Interestingly, gender differences in higher education are more pronounced outside the Capital Area. In the general population of the Capital Area, there are about 101 women to every 100 men but on average only 96 women to every 100 men in other regions of the country. In the university educated population, however, there are about 136 women to every 100 men in the Capital Area and 165 women in other regions.

Although Iceland is not a member of the European Union, there are no restrictions on migration within the European internal market. Iceland is a full member of the joint European labour market through the EEA agreement between the European Union and the European Free Trade Association (EFTA, 2016). There are no reliable statistics on the number of university educated Icelanders living abroad, but according to the 2011 census about 7% of the university educated population in the capital region and 9% in other regions are foreign nationals (Statistics Iceland, 2017c).

The public University of Iceland (UI) established in Reykjavík in 1911 is by far the largest institution of higher education in Iceland with about 13 thousand students (Statistics Iceland, 2017e). That accounts for 68% of all university students in the country. UI offers 85 degree programs in most areas of academic enquiry, including the only national programs in several fields, such as history, languages, medicine, engineering and theology. The two other smaller universities in the Capital Area are the private Academy of Arts (est. 1999) and Reykjavík University (est. 2000).

UI is primarily organized for on-campus students but does also allow off-campus distance students at the discretion of different departments and individual teachers. The UI registrar's office does not keep track of distance students but estimates that perhaps 8–9% of all graduating students complete at least one class at distance ([Author citation], 2016). This figure includes capital region residents taking distance classes because of the flexibility in time rather than space. It is not known how many students living outside the capital area complete their studies as distance students. Other Reykjavik universities have similarly limited distance education programs.

There are also four independent universities outside the Capital Area. The public University of Akureyri (UNAK) established in 1987 is the largest with almost two thousand students, accounting for 68% of all students at institutions outside the Capital Area (Statistics Iceland, 2017e). It offers 23 degree programs within Health Sciences, Natural Sciences, and Social Sciences and Humanities. The degree programs are with a few notable exceptions equivalent to programs offered at UI or interdisciplinary permutations of such degree programs. Other smaller universities outside the Capital Area include the private Bifröst University (est. 1988), and the public Icelandic Agricultural University (est. 2005) and Holar University College (est. 2007).

UNAK was founded with the explicit regional development mission of raising educational levels in all regions of the country and focusing research on issues relevant to rural areas (Edvardsson, 2014). It pioneered distance education in Iceland in the early 1990s, currently offering all programs both on-campus and at distance with the support of web-based technology, on-campus study periods and numerous regional learning centres throughout the country. The other universities outside the Capital Area have since developed somewhat comparable systems of distance education.

While prior research has not explored the pathways from place of origin to residence after graduation, there is a strong correspondance between the location of Icelandic universities and the future residence of professional students. Edvardsson (2001) found that 89% of business graduates and 79% of nursing graduates from UI in Reykjavík continued to live in the Capital Area after graduation. Only 10% of the UI business graduates and 16% of the UI nursing graduates lived in other parts of Iceland. In contrast, 83% of UNAK business graduates and 73% of UNAK nursing graduates lived outside the Capital Area after graduation. More than half of the UNAK graduates lived in Akureyri where the university is located but professional UNAK graduates were also 2–3 times as likely as professional UI students to live in other areas of the country.

4. Data and methods

This study seeks to map the trajectories of students who graduate from the University of Iceland (UI) and the University of Akureyri (UNAK), respectively. The national ID numbers of all graduating baccalaureate students from UI in Reykjavík and UNAK in Akureyri in the period 1991–2015 were obtained from the respective registrar’s offices. The files also included information on the gender, program of study and year of graduation of each student. Statistics Iceland linked each ID with municipal codes of residence five years prior to graduation and five years after graduation. For confidentiality reasons the files were returned to the research team without the national ID numbers.

Table 1 shows that almost 24 thousand students completed a baccalaureate degree from these two universities in the twenty year period 1991–2010. Almost nine in ten students in the sample graduated from the University of Iceland. The number of graduations increased substantially over time in this period, in particular at UNAK where half the graduations took place in the last five years of the twenty year period. Women were about two of every three UI graduates and more than three of every four UNAK graduates. At UNAK, women were 75% of a registered on-campus graduates and 87% of all registered distance graduates.

Table 1 about here

Students in Social Sciences and Humanities were 69% of all UI graduates and 62% of all UNAK graduates. Within this category, education accounts for 21%, economics, business and

law 17% and other social sciences account for 32% of all graduates from these two universities in the period under study.

Due to the relative size of the UNAK program in nursing and occupational therapy, students in Health Sciences accounted for 28% of all UNAK graduates compared to 16% of all UI graduates. Local students were the largest student group at both universities, in particular at UI. About 68% of UI graduates had lived in the capital area and 50% of all UNAK graduates had lived in the North Central Region five years prior to graduation.

For the purposes of the current study, a distinction is drawn between four categories of residence shown in Figure 1. The first category is the Capital Area of Reykjavík where UI is located and surrounding municipalities. The second category is the Southwest Exurban Region within one hour's commute from Reykjavík. The third category is the North Central Region including the regional centre of Akureyri where UNAK is located and the micropolitan area surrounding Akureyri. The driving distance between Reykjavík and Akureyri is just under 400 km. All other towns, villages and farming communities that are beyond commuting distance from universities are treated as a single category of Other Regions. In addition, other countries are treated as the destination of Abroad. There are thus 60 distinct pathways between these four regions of origin and five destinations through UI, and the on-campus and distance UNAK programs.

Chi-square tests were calculated for each group of origin to determine if differences were greater than could be expected by chance. Multinomial logistic regression analyses (Pampel, 2000) were also performed for each group of origin to determine the statistical significance of differences in future residence between UI and UNAK on-campus and distance program, controlling for year of graduation, gender, and general area of study.

5. Results

Table 2 shows the residence of students from different regions of origin five years after graduation.

Students from the Capital Area. Most students from the capital area still lived there after graduation, but there are some differences by educational pathways. Very few UI graduates from the Capital Area moved to other regions of the country within this time frame. In fact, local UI graduates were much more likely to emigrate abroad than to migrate within Iceland. Only about one in twenty local UI students lived in other parts of the country five years after graduation, while more than twice that number move abroad.

In contrast, about one in eight on-campus UNAK students from the Capital Area lived in the North Central Region five years after graduation. In addition about one in ten students from this group lived in other regions of the country after graduation. Capital Area students at UI and the UNAK distance program are equally likely to stay in the Capital Area after graduation, but the UNAK distance students are more likely to migrate domestically rather than to emigrate abroad.

Table 2 about here

Students from the Southwest Exurban Region. Students from the Southwest Exurban Region close to the Capital Area have the possibility of commuting to UI in Reykjavík on a daily basis. Just under half of the exurban UI students lived in their home community five years after graduation and a slightly lower proportion had moved to the Capital Area. Exurban on-campus UNAK students are equally likely as exurban UI students to return to their home region but UNAK graduates from the region are somewhat more likely to remain in the North Central Region rather than to move to the Capital Area. In contrast, the vast majority of exurban UNAK distance students continue to live in the Southwest Exurban Region after graduation. In fact, exurban distance students at UNAK were slightly more likely to stay in their home region than local Capital Area UI graduates. Only one in fourteen exurban UNAK distance students moved to the Capital Area within five years of graduation, compared to more than two in five exurban UI students.

Students from the North Central Region. Just over one in three students from the North Central Region had returned five years after graduation from UI in Reykjavík, while just under half the group remained in the Capital Area. In contrast, almost three out of four local UNAK graduates from the North Central remained in the region five years after graduation while just under one in five had moved to the Capital Area. There was no difference in future residence between UNAK students from the North Central Region studying on campus or enjoying more flexible hours of study as UNAK distance students.

Students from the Other Regions. UI students from Other Regions of the country have a very similar migration profile as UI students from the North Central Region. Just over one in three UI students from Other Regions had returned five years after graduation, while just under half of this group remained in the Capital Area. On-campus UNAK students from Other Regions have a somewhat similar profile as on-campus UNAK students from the Southwest Exurban

Region. The majority of students is almost equally split between those returning to Other Regions and those moving onwards to the Capital Area. Finally, UNAK distance students from Other Regions are most likely to remain in those regions after graduation. This proportion of retention is somewhat lower than for distance students from the Capital Area or the Southwest Exurban Region, but somewhat higher than for on-campus or distance students at UNAK from the North Central Region. About one in eight UNAK distance students from Other Region move onward to the capital region, compared to about half of their counterparts at UI in Reykjavík.

Multinomial Logistic Regression. Table 3 shows the results of a series of multinomial logistic regression models for students from different areas and regions. In each case, living in the region of origin is the omitted reference category on the dependent variable.

Table 3 about here

Each model includes controls for year of graduation, gender and general field of study. The results show that graduates from outside the Capital Area have over time become less likely to move either to the Capital Area (OR 0.93–0.98) or Abroad (OR: 0.96–0.97), while Capital Area students have become less likely to move domestically beyond commuting distance from Reykjavík (OR: 0.95–0.98) and more likely to move Abroad (OR: 1.01).

Female university graduates are more likely than males to move from the Capital Area to the adjacent Southwest Exurban Region (OR: 1.70), but less likely to move Abroad (OR: 0.80) within five years of graduation. Female graduates from Other Regions are generally less likely than men to move to the Capital Area (OR: 0.54 – 0.77) or Abroad (OR 0.52–0.72). Interestingly, there are no significant gender differences in the migration of recent graduates from the Capital Area to other parts of the country or between regions outside the Capital Area.

The results also suggest a stronger flow of graduates in natural sciences and health sciences towards the capital region and abroad. Graduates in these fields are more likely than graduates in social sciences and humanities to move from Other Regions of the country to the Capital Area (OR: 1.53–1.85), and graduates from all regions are more likely to move abroad (OR: 2.01–3.23).

The result show that UNAK graduates from the Capital Area are more likely to live in other parts of the country than their counterparts who graduated from UI. Capital Area students who studied on-campus at UNAK are more likely to live in the North Central Region and Other Regions beyond commuting distance from Reykjavík (OR: 21.66 and 8.59, respectively). Furthermore, UNAK distance graduates are more likely to live the all regions outside the Capital Area (OR: 1.92–2.38). Conversely, UNAK graduates from Other Regions are less likely to live in the Capital Area five years after graduation. On-campus UNAK students from the North Central Region and Other Regions beyond commuting distance from Reykjavík were less likely to move to the Capital Area (OR: 0.17 and 0.47, respectively), as were distance UNAK students from all regions outside the Capital Area (OR: 0.11–0.25).

Finally, the results also show that UNAK on-campus graduates are more likely than their UI counterparts to live in the North Central Region five years after graduation. On one hand, local UNAK graduates from the North Central are less likely than their UI counterparts to live in Other Regions or Abroad five years after graduation (OR: 0.17–0.52). On the other hand, on-campus UNAK graduates from Other Regions were more likely to live in the North Central than UI students from the corresponding regions (OR: 38.94, 21.66, and 6.78, respectively).

6. Discussion

Efforts to maintain and increase regional levels of higher education have been described as a two-front war to retain educated people in the region and attract new residents from other regions (Helgesen, Nettet and Strand, 2013). Such efforts more generally involve a complex interaction and competition between hemispheres, continents, nation states, cities, regions and local areas. Larger and more dynamic cities tend to draw both university students and university graduates from other areas (e.g. Faggian and McCann, 2009; McClelland and Gandy, 2012; Winters, 2011c) in a somewhat similar fashion as wealthier, developed countries draw students and graduates from poorer, developing countries (e.g. Aluttis, Bishaw and Frank, 2014; Beine, Docquier and Rapoport, 2008; Haupt, Krieger and Lange, 2016). Smaller regional centres may for instance simultaneously compete with e.g. global and national cities, other regional centres, peripheral local areas, and distant countries embroiled in poverty or war.

The monocentric pattern of urbanization and higher education in Iceland provides an interesting setting for the study of these processes. About 64% of the population and 76% of

the university educated population lives in the capital area of Reykjavík (Statistics Iceland, 2017d). The University of Iceland (UI) in Reykjavík has contributed to this pattern as the only university in the period of rapid urbanization 1911–1986 and currently by far the largest university in the country. UI accounts for almost seven out of ten university students in Iceland, and additional two out of ten study at the two other university institutions in Reykjavík (Statistics Iceland, 2017e). The four small university institutions outside the capital area of Reykjavík collectively account for the remaining one in ten university students.

The results of this study show that UI retains most local students in the Capital Area. More than four in five UI graduates from the Capital Area still lived there five years after graduation. This is similar to the proportion of Xavier University graduates still in the Cincinnati metropolitan area (Blackwell, Cobb and Weinberg, 2002) but somewhat lower than the proportion of local graduates still living in London (Hoare and Corver, 2010) or Helsinki (Haapanen and Tervo, 2012) after graduation. In a global context, UI has thus been quite successful in counteracting brain drain from the Reykjavík capital area to other countries.

The University of Iceland has also played an instrumental role in the migration of university graduates to the Capital Area from other regions of the country. About half the UI graduates from the Exurban Region within commuting distance from Reykjavík were still in their region of origin five years after graduation. This is similar to the return rate of students to other areas of England than London (Hoare and Corver, 2010). In regions beyond commuting distance from Reykjavík, just over a third had returned home five years later. This can be compared to the return rate of students to Scotland, Northern Ireland (Hoare and Corver, 2010) and to regions of Finland other than Helsinki (Haapanen and Tervo, 2012). UI is therefore not very efficient as a tool for providing university education in other regions than the Capital Area. For every graduate returning to other regions from from Reykjavík, two or three graduates remain in the city.

The majority of UI graduates who neither stayed in the capital area nor returned to their home region had emigrated to other countries five years after graduation. This is in particular true of students from the Capital Area, Southwest Exurban Region and the North Central Region who were three to four times more likely to move abroad than down the urban-rural continuum in Iceland. UI graduates from the most rural regions were however just as likely to move up the continuum to the Exurban or North Central Regions as they were to emigrate to other countries. UI thus appears to draw students from all parts of the country who subsequently remain in the Capital Area, return home or move abroad. UI is however not very effective in

providing more rural regions with educated people to replace those lost to more urban regions and to the capital area in particular.

In this respect, the small regional University of Akureyri (UNAK) in Northern Iceland provides an interesting contrast to the University of Iceland in Reykjavík. UNAK has an important role in providing higher education in the North Central Region and in the regional centre of Akureyri in particular. Nationwide, there was about one UNAK enrollment for every ten UI enrollments in the period 1991–2015. In Akureyri, however, there were almost nine enrollments at UNAK for every ten enrollments at UI, and more than five in other areas of the North Central region ([Author citation], 2016). This study found that almost three in four local North Central UNAK graduates were still in the region five years later, compared to just over one in three UI graduates from the North Central Region. The UNAK retention rate is slightly lower than reported for universities in the East Midlands, South East and East of England (Hoare and Corver, 2010) but substantially higher than for universities in regions of Finland outside of Helsinki (Haapanen and Tervo, 2012). Albeit less effective than UI in the capital area, UNAK thus appears to be relative successful in retaining local North Central students after graduation.

Previous research has shown that the economic impact of regional universities tends to be limited to the local area of each institution (Anderssen, Quigley and Wilhelmsson, 2004, 2009; Edvardsson, 2014; Goldstein and Glaser, 2012; Nord, 2002). Similarly, university attendance decreases with distance to campus (Parker et al., 2016; Spiess and Wrolich 2010; Alm and Winters 2009; Jepsen and Montgomery, 2009; Kellström and Regnér, 1999). The current findings demonstrate that on-campus education in the regional centre of Akureyri primarily has an impact on educational levels in Akureyri and to a lesser extent in the North Central Region. On-campus education at UNAK does split migration from more rural regions between the regional centre of Akureyri and the Reykjavík Capital Area but UNAK students from more rural regions are no more likely to return home than their counterparts studying at UI. On-campus education at the regional UNAK is therefore no more effective than UI in providing more rural regions with educated people to replace those lost to more urban regions.

The distance education provided by the UNAK does however appear to have a strong impact on the level of education in more peripheral areas beyond commuting distance from a university campus. About four in five distance education graduates in such regions still lived there five years after graduation. The retention rate for this group was thus more than double

the return rate of those who studied at UI in Reykjavík or on-campus at UNAK in Akureyri. While these results are highly encouraging from the perspective of rural development, the causal arrows should be interpreted with some caution. Enrollment in distance education at home rather than moving to a distant campus may reflect personal predispositions or circumstances that also make migration after graduation less likely. Conversely, prospective students from rural and remote areas may choose to study on-campus in the city precisely because they want to leave. The choice between on-campus and distance studies may thus be the effect of residential aspirations rather than the cause of residential outcomes. Furthermore, the the return rate of university graduates may in part depend on their willingness to accept jobs for which they are overqualified, work outside their area of expertise, pursue self-employment, or risk spells of limited employment. While future studies should attempt to further disentangle these complexities, these results at least show that distance education enables most urban, exurban and rural graduates to stay in their region of origin.

In addition to increasing educational opportunities for rural students, distance education programs frequently offer substantial flexibility in time and space for non-traditional urban students with demanding work commitments or personal circumstances. In the period 1991–2015, close to a third of the UNAK distance students lived in the Capital Area prior to enrollment. They were equally likely as local UI students to continue to live in the Capital Area, but much more likely to move to domestic rather than international destinations after graduation. An additional quarter of the UI distance students were from the Southwest Exurban Region. These students can be expected to have chosen the convenience and flexibility of distance education at home over costs in money and time of commuting to a university in Reykjavík. Interestingly, UNAK distance students from the Exurban Region had the highest retention rate of any group in the study with almost nine out of ten graduates still living in the region five years after graduation. The retention rate for this group was almost double the return rate for exurban students who studied at UI in Reykjavík. Further studies should look more closely at the association between distance studies and mobilities in terms of the life course of students, including age, prior education and prior labour market experiences.

Women are more likely to pursue a university degree in industrised countries (Becker et al., 2010; Parro, 2012; Riphahn and Schwientek 2015; Wells et al., 2013) and greater interest in higher education among women has frequently been cited as a major cause of gender imbalances in rural areas (Corbett, 2007; Lowe, 2015; Rauhut and Littke, 2016; Stenbacka,

2008). Similar conclusions have been drawn in the Icelandic context (Gislason and Olafsson 2006). Women are nevertheless greatly overrepresented in the university educated rural population in Iceland (Statistics Iceland, 2017d) and the results of the current study suggest that female university graduates from other parts of the country are generally less likely than men to move to the Capital Area or Abroad. Prior research has suggested that women in rural Iceland tend to pursue education and occupation that fit the needs of the family and community (Edwardsdottir, 2013; Edvardsson and Oskarsson, 2010). While further research is urgently needed, it can be speculated that the relatively few rural men who pursue university education are more likely to do so in order to establish an urban life, while rural women may be somewhat more likely to pursue education as means of establishing a professional career in areas where traditional female jobs are low level and frequently poorly paid. The gender gap in the pursuit of higher education may thus both contribute to a corresponding gender gap in the university educated rural population and to an inverse gender gap in the general population due to the disproportionate outmigration of rural women.

The results of this study show that over time, university graduates from the Capital Area and the adjacent Exurban Region have become progressively less likely to move to other regions of the country. Conversely, graduates from all other regions are less likely to move to the Capital Area. This is consistent with a more general trend of declining mobility between the Capital Area and regions beyond the southwest exurban region (Statistics Iceland, 2017b) and the declining internal migration observed in other Western countries (Molloy, Smith and Wozniak, 2017; Cooke, 2011; Smith and Sage, 2014). Future studies should explore the extent to which the growth of regional universities has contributed to declining internal migration in general and declining migration of university graduates in particular.

Interestingly, an increasing number of Capital Area graduates but a decreasing number of graduates from other regions moved abroad over time. This is somewhat surprising as international mobility has been increasing over time in all regions of Iceland (Statistics Iceland, 2017a). This does not appear to reflect an increase in the number of Icelandic university students pursuing studies abroad (Statistics Iceland, 2017f). One explanation may be the growth and concentration of university educated people in the Capital Area. The supply of educated people may thus increasingly exceed demand in the most urban area, while demand may still exceed the supply in more rural regions. Alternatively, professional career trajectories in the Capital Area may to a greater degree lead abroad, while more rural regions

may be characterised by shorter and more domestic career trajectories. Further research is needed to explain this pattern.

7. Conclusion and policy implications

These results of this study have various important policy implications for regional development. They strongly suggest that regional universities can be an effective tool to enhance educational levels in regional centres. This may happen through the retention of both local and outside students, to a large degree by attracting students who would otherwise have moved to larger cities. Stronger regional centers may in turn support the regions, but on-campus education at regional universities may not increase educational levels in peripheral areas outside the regional centre.

Distance education on the other hand increases educational levels in urban, exurban and rural regions. By the same token, it counteracts the tendency to reproduce national educational inequalities on the regional level with concentration and growth of regional centres at the expense of more rural areas. Conversely, the effects of such program in urban centres may be limited to a handful of academic and administrative jobs and distance education may in principle even be provided from a major university in a national or international city. While distance education provided by a regional university may fit well with the dynamic between a regional centre and the surrounding region, the future development of distance education may therefore also undermine higher education as a one the pillars of regional centres.

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Figure 1
Locations of the universities and the areas of study in Iceland

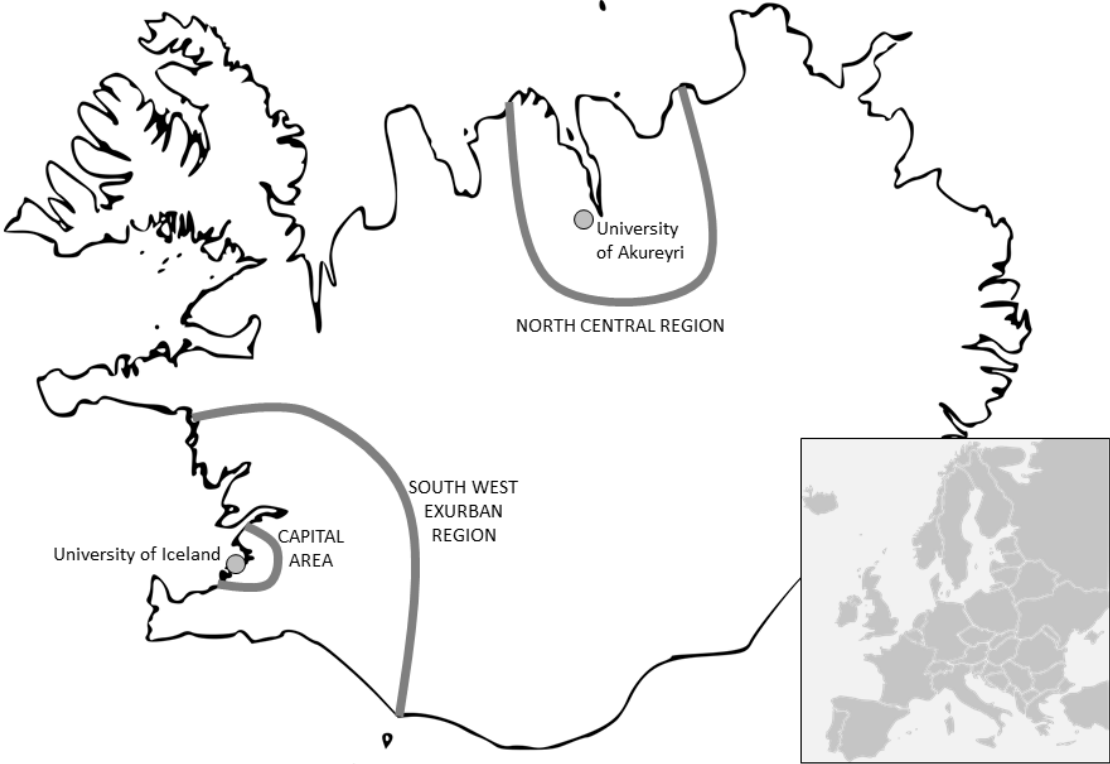


Table 1

Overview of all baccalaureate graduates from the University of Iceland and the University of Akureyri in the period 1991–2010

	University of Iceland	University of Akureyri	Total
Gender			
Male	7,224	548	7,772
Female	14,011	1,960	15,971
<i>Missing</i>	9	0	9
Graduation			
1991–1995	3,187	85	3,187
1996–2000	4,606	364	4,606
2001–2005	6,027	793	6,027
2006–2010	7,424	1,266	7,424
<i>Missing</i>	0	0	0
Field of study	69	62	
Natural sciences	3,538	255	3,793
Health sciences	3,090	696	3,786
Social sciences and humanities	14,616	1,557	16,173
<i>Missing</i>	0	0	0
Residence -5 years			
Capital Area	14,525	540	15,065
Southwest Exurban	2,137	289	2,426
North Central	2,019	1,256	3,275
Domestic Other	1,965	364	2,329
Abroad	560	58	618
<i>Missing</i>	38	1	39
Residence +5 years			
Capital Area	15,300	681	15,981
Southwest Exurban	1,455	247	1,702
North Central	1,061	1,147	2,208
Domestic Other	1,076	286	1,362
Abroad	2,334	142	2,476
<i>Missing</i>	18	5	23
Educational arrangements			
Registered on-campus students	---	1,836	1,836
Registered distance students	---	722	722
Not registered	18,936	---	18,936
Total number of graduates (N)	21,244	2,508	23,752

Table 2

All University of Iceland and University of Akureyri baccalaureate graduates in 1991–2010 by residence five years prior to graduation and five years after graduation

<i>Students from Capital Area</i>	UI graduates	UNAK on campus	UNAK distance	Total
Still in Capital Area	83%	71%	84%	83%
Moved to Exurban	2%	5%	6%	2%
Moved to North Central	1%	13%	3%	2%
Moved to Other Regions	2%	5%	2%	2%
Moved Abroad	11%	6%	5%	11%
Chi-sq: 690.8(8); p < .0001				

<i>Students from Exurban</i>	UI graduates	UNAK on campus	UNAK distance	Total
Still in Exurban	47%	45%	87%	50%
Moved to capital Area	42%	36%	7%	39%
Moved to North Central	1%	8%	1%	2%
Moved to Other Regions	2%	7%	2%	3%
Moved Abroad	8%	4%	4%	7%
Chi-sq: 194.7(8); p < .0001				

<i>Students from North Central</i>	UI graduates	UNAK on campus	UNAK distance	Total
Still in North Central	37%	72%	72%	51%
Moved to Capital Area	48%	19%	18%	36%
Moved to Exurban	2%	2%	4%	3%
Moved to Other Regions	3%	2%	4%	3%
Moved Abroad	10%	4%	1%	8%
Chi-sq: 433.3(8); p < .0001				

<i>Students from Other Regions</i>	UI graduates	UNAK on campus	UNAK distance	Total
Still in Other Regions	36%	38%	78%	39%
Moved to Capital Area	48%	35%	12%	43%
Moved to Exurban	5%	5%	5%	5%
Moved to North Central	3%	16%	2%	5%
Moved Abroad	9%	7%	4%	8%
Chi-sq: 231.0(8); p < .0001				

Table 3**Multinomial logistic regression model of residence five years after graduation among all University of Iceland and University of Akureyri baccalaureate graduates in 1991–2010**

	Moved to Exurban	Moved to North Central	Moved to Other	Moved Abroad
<i>Students from capital area</i>				
Year graduated	1,02	0,98	0,95	1,01
Female	1,70	1,03	1,09	0,80
Sciences	0,64	0,87	0,82	2,01
Health	0,83	1,08	1,36	2,89
UNAK campus	1,78	38,94	6,71	1,04
UNAK distance	2,38	2,15	1,92	0,36
<u>Model fit</u>				
<i>Cox and Snell</i>	0,06			
<i>Nagelkerke</i>	0,08			

	Moved to Capital area	Moved to North Central	Moved to Other	Moved Abroad
<i>Students from exurban</i>				
Year graduated	0,93	0,88	0,94	0,97
Female	0,54	0,60	0,69	0,52
Sciences	1,81	0,25	0,64	2,22
Health	1,59	0,96	1,06	3,23
UNAK campus	0,92	21,66	8,59	0,91
UNAK distance	0,11	0,38	0,51	0,33
<u>Model fit</u>				
<i>Cox and Snell</i>	0,16			
<i>Nagelkerke</i>	0,18			

	Moved to Capital area	Moved to Exurban	Moved to Other	Moved Abroad
<i>Students from North Central</i>				
Year graduated	0,98	1,02	0,97	1,00
Female	0,77	1,38	0,70	0,72
Sciences	1,75	0,91	2,07	3,23
Health	1,53	0,86	1,17	2,69
UNAK campus	0,17	0,32	0,52	0,19
UNAK distance	0,25	0,81	1,27	0,07
<u>Model fit</u>				
<i>Cox and Snell</i>	0,17			
<i>Nagelkerke</i>	0,19			

	Moved to Capital area	Moved to Exurban	Moved to North Central	Moved Abroad
<i>Students from other</i>				
Year graduated	0,96	1,01	0,95	0,96
Female	0,69	0,84	0,81	0,84
Sciences	1,84	0,92	1,44	2,61
Health	1,85	0,87	1,16	2,87
UNAK campus	0,47	0,19	6,78	0,77
UNAK distance	0,12	0,38	0,21	0,21
<u>Model fit</u>				
<i>Cox and Snell</i>	0,14			
<i>Nagelkerke</i>	0,15			