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International Student Migration in Finland: The Role of Graduation on Staying

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ABSTRACT

There is increasing attention on the retention of international students, with many stakeholders desiring to keep international students for long-term economic growth. This study examined the factors affecting international students choosing to stay in Finland 5 years after initial enrollment, with particular focus on the role graduation plays in students staying or leaving. Tracking 11 years of entering cohorts for 5 years across national (Finland) data registries, we found evidence of an inverse relationship between graduation, degree type, and the probability of staying: The higher the degree level, the less likely an international student is to stay after graduation. We conclude that while graduation is a key metric and discussion point in national and institutional policy, our findings suggest focusing on improving international students' ability to integrate into a host country's labor market and promotion of an environment conducive for international students' families, more than graduation, would produce higher stay rates of international students.

Keywords: graduation, international students, international student migration, stay rates

INTRODUCTION

Internationalization of higher education is a subject of major interest globally. The rapid increase of students moving across borders for education has raised questions of how many international students choose to stay, as well as what influences them to stay in the country where they studied. While the internationalization of higher education is much more than just students' moving across borders—it is an important manifestation of how higher education has become more international (Caruso & de Wit, 2015).

Traditionally, Finland has been a country of emigration, particularly to other Western countries, and not one of immigration (Heikkilä, 2012). While Finland does have a long, albeit small in numbers, history of immigration (Kärkkäinen, 2017), it was not until the 1990s that increasing numbers of immigrants came to Finland (Heikkilä, 2012). When Finland joined the European Union (EU) in 1995, it ushered in a new policy phase of "managed migration" (Saarinen, 2011, p. 148), which coincided with the growth of immigrants into Finland. International students (degree seeking) in Finland substantially increased from just over 6,000 in 2000 to around 21,000 studying in 2016 (Centre for International Mobility [CIMO], 2011, 2014; Finnish National Agency for Education, 2017). This was partly driven by the implementation of the internationalization strategy for Finnish higher education (Ministry of Education and Culture [MEC], 2009) aiming to increase the number of international degree students to 20,000 by 2015 (Shumilova et al., 2012). This article examines international students[1] migrating to Finland and the role graduation has on them staying. Students staying refers to them living in Finland 5 years after initial enrollment regardless of the reason (still studying, working, family, etc.).

[1] In Finland, international students often go by the designation of "foreign students," and in most cases the term refers to students with a non-Finnish nationality. This is present in numerous policy documents and newspaper articles. In European-level policy documents, international students usually go by the term "third-country students." Literature (see Marginson, 2012, for example) shows these labels (foreign students and third-country students) are problematic as they portray international students as the "other," someone who is inferior or does not fit into society. As such, the term "international student" is the naming convention for this article for non-Finnish (both EU/European Economic Area [EEA] and non-EU/EEA) students in Finnish higher education.

LITERATURE REVIEW

International Student Mobility and Migration

The issue of international student mobility and migration is currently a topic of considerable interest not just in Finland (CIMO, 2014, 2015; Finnish Broadcasting Company, 2015; Mathies & Karhunen, 2020, 2021; Shumilova et al., 2012), but also throughout Europe (Choudaha & de Wit, 2014; Riaño et al., 2018). A shift toward a controlled immigration of international students and increasing measures aimed to improve their stay rates across Europe (Caruso & de Wit, 2015) occurred in large part due to concerns about decreasing or low birth rates and an aging population. Attracting international students is a way to increase the number of skilled workers in the global knowledge economy (European Commission, 2010; King & Raghuram, 2013; Ministry of Interior, 2013; Riaño et al., 2018).

In contrast to global trends of tightening immigration restrictions, many nation-states have extended visa time limits to international student graduates to enable them to look for employment in the host country (Riaño et al., 2018). International students are "ideal" immigrants as they are skilled and most are in prime employment age (Mosneaga & Winther, 2013). International students are attractive to host countries because they have trained for that country's labor market, are cheaper to recruit than international degree holders, and do not require a lengthy or complex process to recognize qualifications (degrees) as those earned overseas would (Robertson, 2013; Ziguras & Law, 2006). In short, nation-states actively compete for international students because they are a way to gain skilled workers and offer a premium over migrants educated (or trained) elsewhere (Hawthorne, 2018).

In Finland, it is seen as essential for economic development "… that international students who graduate from Finnish higher education institutions will remain in Finland and become integrated in the society and the labor market" (CIMO, 2015, p. 6). Finland has Europe's fastest aging population (Razvadauskas, 2016) and since 2001, Finland's government has enacted numerous policies aimed to attract, retain, and integrate international students into Finland (Jokila et al., 2019). The EU's visa directive governing non-EU/EEA students allows graduates to stay in the host country for a minimum of 9 months after graduation to search for employment (European Parliament, 2016). In 2018, the Finnish government expanded beyond this and now allows graduates 2 years (extendable to 4 years) to find employment (Ministry of Interior, 2018).

International Student Migration Theory

International student migration (ISM) is a theoretical framework within global migration and human capital literatures (King & Sondhi, 2018). It sits at a nexus among education and migration policies while intersecting with labor market needs and demands (Robertson, 2013). Previous models of student migrants with fixed entry and exit have evolved; it is now a multistage process of

individuals who arrive on student visas and remain on temporary visas until they fulfill the criteria for permanent residency (Robertson, 2013). ISM conceptualizes how international students go abroad to study and why higher education institutions (HEIs), governments, and students themselves are interested actors.

While ISM is concerned with international students coming into a country for a degree (degree mobility), it also takes into account the anticipated future long-term economic benefits (for students, HEIs, and countries), family ties, and policy (educational, migration, internationalization; King & Sondhi, 2018). ISM is a dynamic process where an individual student's agency is simultaneously constrained and enabled by external factors such as government or institutional policy, family considerations, and labor market opportunities (Mosneaga & Winther, 2013). Previous research using ISM as a theoretical framing shows family ties and labor market opportunities increase the probability of international students staying in Finland after graduation (Mathies & Karhunen, 2021). Roughly two out of three international graduates stay in Finland 3 years after graduation (Mathies & Karhunen, 2021), and it is a higher stay rate compared to other European countries (see Nuffic, 2016; Ministry of Higher Education and Science, 2018; Tran, 2014).

Framing the Study

For this study, we examined the role graduation has on the decision to stay in Finland for international students. We examined graduation because it allows two things. First, it helps international students in the labor market of the host country because they can compete for highly skilled employment—that is, they are qualified for highly skilled employment. Second, many countries, including Finland, allow for a visa extension of international (non-EU for Finland) graduates to search for employment. Once employed, the international graduates transition to an employment visa. We hypothesized that international graduates would have higher stay rates than nongraduates due to their ability to compete for skilled employment and extend visas (non-EU international students). This led to our first research question:

> RQ1: Is there a difference in stay rates of international students who graduate and those who do not?

For our second research question, we constructed a model framed from ISM theory that family ties and employment influence the probability of staying. From here, we added graduation as an additional control to expand the model for this study. This led to our second research question:

> RQ2: Which factors relate to an increased or decreased probability of staying in Finland, and to what degree, for international students who graduate and for those who do not?

METHOD

Data Collection

Our initial sample consisted of all international students starting their enrollment in a university (14) or a university of applied science (24) in Finland between 2000 and 2010.[2] The sample ($N = 26{,}391$) comprised all international students (defined as students having non-Finnish nationality) who started their enrollment according to the student registry file maintained by Statistics Finland. Individuals were conditionally included based on having a valid Finnish personal identification number (*henkilötunnus*); this registry collects data on all individuals enrolled in an educational institution in Finland. We combined our sample, via Finnish personal identity code, to Finnish national registries containing data on all individuals who resided in Finland between 1970 and 2015.

We followed students 5 years after their initial enrollment using national registries data administered by Statistics Finland. Variables were collected from the Finnish Longitudinal Census Files for age, sex, nationality, region of residence, number of children, marital status, spouse's nationality if married, and parents' place of residence if in Finland, and from the Longitudinal Employment Statistics Files for employment, work status, wage earnings, and sector of work. The Register of Completed Education and Degrees provided information on the degree type, field of education, date of graduation, and institution granting the degree.

Sample

Between 2000 and 2010, we observed 26,391 students who were of non-Finnish nationality in the enrollment year. We constrained our sample by excluding those individuals who completed secondary education in Finland prior to enrollment in higher education ($n = 3{,}839$). In addition, we removed those who spoke Finnish or Swedish as their first or native language ($n = 1{,}547$) and those who were over 45 years old when first enrolling ($n = 483$). We excluded these students to concentrate on students who likely moved to Finland to study. In summary, we had in our final sample 20,522 international students. Due to the degree structures in Finland, international bachelor's degree students are in the universities of applied sciences (UAS), while master's and doctoral degree

[2] There have been a number of mergers between HEIs in Finland since 2000. The number of institutions listed here for each section of Finnish higher education reflects the current structure. Graduates from merged HEIs count in the new HEI's numbers.

students are in universities. By degree type there were 9,577 international students enrolled in bachelor's degree programs in UAS; 7,809's enrollees in master's programs and 3,136 students enrolling in either a licentiate or PhD degree in universities.[3]

Use of Population Data

Since this study used population data, there was no expectation of error when estimating the expected value(s) of the population parameter. Thus, the differences among the degree types (Tables 1 through 3) represent true differences even though the tables reflect simple descriptive results of stay and graduation rates. In other words, there was no need to test for significance of differences among the degree types when using population data.

Measurements of Variables

To construct our dependent variable, staying in Finland, we used the population registry data on the place of residence and activity during a calendar year.[4] We defined the decision to stay as follows: student had stayed in Finland if we observed a place of residence from the registry *and* if one had positive wage earnings, paid any taxes, or received any transfer payments (state subsidy) during the year of interest (5 years after initial enrollment). Otherwise, we assumed the individual left the country.[5] The normative time to degree for a bachelor's is 3 year's, 2 years, and doctoral 4 years.

For control variables, age, gender, region of nationality, and field of education were measured based on year of entry. For control variables of employment, study region, marriage, children, and other family members,

[3] Some individuals were in the sample more than once. This is due to the student enrolling in multiple degree programs between 2000 and 2010. Most of the duplicates were students who completed one degree and stayed in Finland for a second degree (e.g., master's and PhD). We made the choice to keep students as they showed in the data as no better solution arose to account for these students.

[4] When migrating away from Finland, individuals are to inform local register offices about their migration decision. If one leaves the country without informing the officials, it is possible that the last place of residence still shows in the registry for an extended period after the individual has left.

[5] For robustness check, we evaluated how our results differed if we used only the place of residence as an indicator of migration behavior. The method including activity was better as it more accurately identified individuals who stayed.

measures were based on the last year of nonmissing records over the 3-year period[6] after the enrollment year ($t + 1$, $t + 2$, $t + 3$, where t = enrollment year).

Modeling

Due to the binary nature of staying in Finland (yes/no), we developed a series of logistic regression models to estimate the probability of an international graduate staying after 5 years (dependent variable) controlling for variety of independent variables. Specifically, we developed individual logistic regression models for each degree type. We estimated the following model:

$$y_{i,t} = x_i'\beta + u_{it}$$

where $y_{i,t}$ is a binary indicator showing if an international student i stays in Finland 5 years after initial enrollment year, t; x_i is vector of covariates; β is vector of regression coefficients; and u_{it} is the error term. Independent variables (see Appendix Table A1 for descriptive statistics) included controls for demographics, family ties, employment, location of the degree granting institution, study field, and graduation. To be clear, we have made no causal claims in our analysis but for ease of interpretation of the results, we show marginal effects (in Tables 4 and 5) describing observed relationships relative to the chosen base group.

RESULTS

Stay Rates

Table 1 introduces our sample ($n = 20{,}522$) consisting of international students enrolling in Finnish higher education between 2000 and 2010 and the stay rate 5 years after initial enrollment. We found 75% of all international students enrolling in Finnish higher education were still in Finland 5 years after initial enrollment. We found differences among degree types as 79% of bachelor's, 71% of master's, and 70% of doctoral enrollees were still in Finland 5 years later.

[6] We used last year of record over the first 3 years after initial enrollment to capture family ties prior to the observation year (5 years after initial enrollment). This is to measure control variables before the outcome (time) to try to remove reverse causality issues (e.g., it is not marriage [family ties] that affects migration decision, but the migration decision [stay or leave] causes one to get married).

Table 1: All International Students and Stay Rate

Year	Enrollees by degree type (*n*)				Stay 5 years after enrollment (%)			
	Bachelor's	Master's	Doctoral	Total	Bachelor's	Master's	Doctoral	Total
2000	426	319	165	910	81	80	73	79
2001	484	335	164	983	81	84	71	80
2002	504	377	182	1,063	83	82	74	81
2003	537	570	304	1,411	80	72	65	74
2004	753	540	226	1,519	80	73	73	76
2005	774	681	263	1,718	79	73	68	75
2006	1,005	794	266	2,065	78	74	72	76
2007	1,054	828	283	2,165	80	71	68	75
2008	1,535	1,044	363	2,942	78	68	74	74
2009	1,240	1,113	391	2,744	75	65	66	70
2010	1,265	1,208	529	3,002	79	66	73	72
Total	9,577	7,809	3136	20,522	79	71	70	75

Graduation Rates

Table 2 presents the number of international students who graduated (n = 12,781) within 5 years and the graduation rate for each entering cohort by degree type. We found over 62% of international students enrolling in Finnish HEIs graduated within 5 years. We found differences between degree types as 64% of bachelor's and master's enrollees graduated within 5 years while only 53% of doctoral enrollees did. Additionally, we reported differences between cohorts as the more recent cohorts had higher graduation rates than earlier cohorts.

Table 2: International Enrollees Who Graduated Within 5 Years

	Graduates by degree level (*n*)				Graduation rate (%)			
Year	Bachelor's	Master's	Doctoral	Total	Bachelor's	Master's	Doctoral	Total
2000	245	130	83	458	58	41	50	50
2001	304	148	81	533	63	44	49	54
2002	320	173	90	583	63	46	49	55
2003	307	297	158	762	57	52	52	54
2004	470	319	132	921	62	59	58	61
2005	470	444	130	1,044	61	65	49	61
2006	617	532	136	1,285	61	67	51	62
2007	652	543	129	1,324	62	66	46	61
2008	1008	742	192	1,942	66	71	53	66
2009	835	791	218	1,844	67	71	56	67
2010	899	878	308	2,085	71	73	58	69
Total	6,127	4,997	1,657	12,781	64	64	53	62

Stay Rates and Graduation

Table 3 presents the stay rates of international enrollees based on whether they graduated within 5 years after initial enrollment. We observed international students who had not graduated had a higher rate (77%) of staying in Finland after 5 years than those who had graduated (73%). However, we found differences among degree types. For bachelor's enrollees, those who graduated (80%) had a higher rate of staying than those who did not (77%). For master's and doctoral enrollees, we found the opposite as those who did not graduate (master's 78%, doctoral 76%) stayed a much higher rate those who did graduate (master's 67%, doctoral 66%). Additionally, we found earlier cohorts for master's enrollees, regardless of graduation or not, had higher stay rates.

Table 3: International Students and Stay Rates Based on Academic Success (Y/N)

	Stay rate with graduation (%)				Stay rate without graduation (%)			
Year	Bachelor's	Master's	Doctoral	Total	Bachelor's	Masters	Doctoral	Total
2000	84	70	72	78	77	87	73	81
2001	81	77	64	77	81	89	77	84
2002	85	75	64	79	79	88	83	84
2003	80	67	60	71	78	78	71	77
2004	81	69	70	76	77	79	76	78
2005	80	69	62	73	79	79	74	78
2006	77	70	66	73	80	81	78	80
2007	81	70	61	74	80	74	73	76
2008	80	66	71	74	74	71	78	74
2009	77	63	61	69	71	71	72	71
2010	78	62	69	70	79	75	79	77
Total	80	67	66	73	77	78	76	77

Logistic Model Results

Table 4 presents the average marginal effects from three logistic models by degree type. As we focused on factors related to the decision to stay long term in Finland, our analysis concentrated on migration probability 5 years after initial enrollment. We emphasize the measure (capture) of our explanatory (independent) variables was before the end of the 5-year period, not after. Graduation related to higher probability (4%) of staying in Finland 5 years after initial enrollment for bachelor's students while the coefficient was not significant for master's students and a lower probability (12%) for doctoral students. All three models suggest family ties (marriage, children, and other family) related to a higher probability of staying except for the variable of other family for doctoral students (not significant). Employment opportunities (employment and employment in white-collar job) also related to higher probability of staying compared to reference group (i.e., not employed) though the relationship was weaker for bachelor's students than master's and doctoral. In terms of academic fields, we found mixed results across degree types with some increasing and some decreasing in probability compared to the reference group (i.e., social sciences,

business, and law). In terms of personal demographics, students with nationalities from non-EU European countries had higher probability of staying across all three degree types than those coming from EU countries (reference group). Students with nationalities from Asia and Africa had higher probability of staying for only UAS degrees.

Table 4: Background Factors and the Decision to Stay 5 Years after Enrollment by Degree Type

	Bachelor's	Master's	Doctorate
Enrollment age groups			
>20	−0.003 (0.011)	0.037 (0.033)	N/A
25–29	Reference group	Reference group	Reference group
30–34	0.024 (0.008)	0.001 (0.012)	−0.082 (0.045)*
35–45	0.060 (0.012)	0.015 (0.016)	−0.080 (0.046)*
Male	0.026 (0.008)***	−0.004 (0.011)	−0.004 (0.018)
Family ties			
Not married	Reference group	Reference group	Reference group
Married to non-Finn	0.045 (0.009)***	0.115 (0.013)***	0.145 (0.021)***
Married to Finn	0.121 (0.009)***	0.178 (0.014)***	0.215 (0.024)***
Has a child	0.154 (0.013)***	0.170 (0.017)***	0.158 (0.021)***
Other family	0.277 (0.018)***	0.414 (0.032)***	0.141 (0.097)
Earlier stay in Finland	0.070 (0.010)***	0.087 (0.012)***	0.044 (0.018)**
Employment			
Not employed	Reference group	Reference group	Reference group
Employed	0.222 (0.009)***	0.317 (0.015)***	0.270 (0.033)***
Employed in white-collar job	0.181 (0.010)***	0.289 (0.012)***	0.309 (0.023)***
Study region			
Capital region	Reference group	Reference group	Reference group
Large city regions	0.001 (0.014)	0.016 (0.013)	0.044 (0.021)**
Other regions	−0.017 (0.007)**	0.039 (0.012)***	0.059 (0.022)***
Has graduated	0.038 (0.007)***	–0.011 (0.011)	−0.122 (0.018)***
Field of education			
Social science, business, and law	Reference group	Reference group	Reference group
Education	−0.059 (0.049)	−0.084 (0.035)**	−0.039 (0.072)
Humanities and art	−0.006 (0.049)	−0.022 (0.015)	−0.014 (0.035)
Science	N/A	0.028 (0.017)*	−0.078 (0.029)***
Technical	0.035 (0.008)***	−0.018 (0.014)	0.035 (0.027)

	Bachelor's	Master's	Doctorate
Health and welfare	0.047 (0.013)***	0.121 (0.032)***	−0.096 (0.032)***
Other	0.004 (0.012)	−0.025 (0.028)	−0.017 (0.049)
Region of origin			
EU-28	Reference group	Reference group	Reference group
Other Europe and Turkey	0.088 (0.012)***	0.114 (0.018)***	0.105 (0.026)***
Asia	0.048 (0.010)***	0.019 (0.014)	0.034 (0.022)
Africa	0.078 (0.012)***	0.015 (0.020)	−0.002 (0.033)
Other	−0.004 (0.018)	0.002 (0.021)	−0.011 (0.036)
Average predicted probability	.788	.711	.703
Pseudo R^2	.253	.257	.169
Log likelihood	−3699	−3476	−1584
Observations	9,577	7,809	3,136

Note: Dependent variable: 1 = Living in Finland, 0 = otherwise. Clustered (by id) standard errors in parentheses. Table shows average marginal effects. Model includes also enrollment year dummies to account for business cycle (and other) variation. $^{***}p < .01$, $^{**}p < .05$, $^{*}p < .1$.

Interaction Results

As our interest was in graduation, the results from Table 4 suggest that further exploration between nationality and field of education could possibly lead to a deeper understanding of the factors related to staying in Finland after 5 years. As such, we repeated our estimations by degree types (two groups, bachelor's students in UAS and university students, master's and doctoral combined) and added interactions between nationality and degree field (see Table 5). We grouped international students into EU/EEA and non-EU/EEA student groups specifically to examine visa considerations (non-EU/EEA students require a visa to stay after graduation) on the decision of staying. We found higher probability of staying for non-EU/EEA UAS students was limited to the technical (4%), health and welfare (5%), and other (3%) academic disciplines compared to the reference group (i.e., social sciences, business, and law). For non-EU/EEA university students, we found students in education (10%), humanities and arts (4%), and technical (2%) disciplines were more likely to leave compared to reference group. These results remain similar even if we focus just on graduates (Panel B).

Table 5:

Variable	UAS bachelor's	University (master's and doctoral)
Panel A: All students		
Region of origin		
EU-28	Reference group	Reference group
Outside EU-28	.062 ***(.013)	.038 ***(.010)
Field of education		
Social science, business, and law	Reference group	Reference group
Education	.049 (.059)	−.065 **(.033)
Humanities and art	.024 (.024)	−.019 (.014)
Science	N/A	−.006 (.013)
Technical	.040 ***(.009)	−.017 (.011)
Health and welfare	.052 ***(.012)	.002 (.017)
Other	.012 (.014)	−.021 (.023)
Conditional: Region of origin outside EU-28		
Education	.043 (.070)	−.101 ***(.035)
Humanities and art	.036 (.028)	−.039 **(.017)
Science	N/A	−.000 (.016)
Technical	.040 ***(.009)	−.023 *(.012)
Health and welfare	.050 ***(.014)	−.024 (.022)
Other	.027 *(.015)	−.015 (.028)
Number of observations	9,577 (7,958)	10,945 (7,723)
Average predicted rate	0.788	0.708
Panel B: Only graduates		
Region of origin		
EU-28	Reference group	Reference group
Outside EU-28	.067 ***(.015)	.046 ***(.013)
Field of education		
Social science, business, and law	Reference group	Reference group
Education	N/A	−.124 ***(.042)
Humanities and art	.074 ***(.026)	−.045 ** (.018)
Science	N/A	−.006 (.017)
Technical	.034 ***(.011)	−.044 ***(.015)
Health and welfare	.082 ***(.015)	−.020 (.025)
Other	.009 (.017)	−.026 (.029)
Conditional: Region of origin outside EU-28		
Education	N/A	−.098 *(.050)
Humanities and art	.079 ***(.032)	−.066 ***(.023)
Science	N/A	−.007 (.020)
Technical	.039 ***(.012)	−.041**(.017)

Variable	UAS bachelor's	University (master's and doctoral)
Health and welfare	.084 ***(.016)	−.036 (.031)
Other	.036 *(.019)	−.006 (.035)
Number of observations	6,093 (5,045)	6,654 (4,789)
Average predicted rate	0.796	0.667

Note: Table shows average marginal effects (SD). Dependent variable: 1 = Living in Finland, 0 = otherwise. $^{***}p < .01$, $^{**}p < .05$, $^{*}p < .1$.

DISCUSSION

The results suggest a number of findings related to the ISM theoretical framework (family ties and employment) and graduation. The findings (Table 1) show a high rate of international students (75%) staying in Finland 5 years after initial enrollment. When examining by degree type, there was variation, but not much, as all three degree types had stay rates over 70% individually. As previously discussed, this study used population data so the results of a high overall stay rate with slight variation among the degree types represents true differences among the degree types. These high stay rate findings are comparable to previous studies (CIMO, 2016; Mathies & Karhunen, 2021) using population data on stay rates (65%–72%) of international students in Finland, though these studies focused on stay rates of only graduates. Also similar to the Mathies and Karhunen (2021) study was bachelor's graduates staying at about a 10% higher rate than master's and doctoral graduates. In a broader context, these high stay rates are much higher than the global stay rate for international students of 25% from Organisation for Economic Co-operation and Development (OECD, 2011) and other European countries such as the Netherlands (38%; Nuffic, 2016), Denmark (58%; Ministry of Higher Education and Science, 2018), and Norway (50%; Tran, 2014). It is noteworthy that the calculations of all these other national rates were different from one another (e.g., OECD rate used changes in visa status), but are mentioned as a baseline of an approximate comparison.

Differences in Stay Rates Within Degree Types

In examining graduation and stay rates of international students (RQ1), we found variance among all degree types between graduates and nongraduates (Tables 1 and 3). However, when we looked at the logistic models for each degree type (Table 4) there is a pattern in how graduation changed the probability of staying across the degree types (RQ2). It points to an inverse relationship among graduation and stay rates with degree level; the higher the degree level of graduation, the decrease in probability an international student stays.

Our hypothesis that international students who graduated have higher stay rates than nongraduates appears to be valid for only UAS bachelor's students. In some ways, this is not surprising as a UAS degree traditionally is more often applied in nature and frequently provides direct pathways into employment within the (national) Finnish labor market. One possible explanation for the

nonsignificance of graduation for master's students is these students compete in a more regional (in Finland's case, Nordic and European) and global labor market; most are mobile after their education and many enter doctoral programs. One explanation of the decrease in probability of staying that graduation had for doctoral students is these students are in specialized and highly competitive labor markets. In the public sector this includes academia and government (ministries) positions, while in the private sector, particularly for STEM majors, this includes knowledge-intensive industries. All of these labor markets/sectors are heavily reliant on professional knowledge and skills with limited openings each year. As such, the competition for positions for employment within a county for doctoral graduates is fierce and likely more competitive, in general, than for master's and bachelor's students. As such, finding employment as a doctoral graduate might require moving abroad to another country.

Factors Relating to Probability of Staying

As for the factors relating to an increased or decreased probability of staying in Finland, and to what degree (RQ2), we found family ties (marriage and having children) had similar increases in the probability of staying for all three degrees, but graduation decreased (12%) the probability for doctoral students. Doctoral students, however, had much higher rates of marriage and children than master's and bachelor's students (see Appendix Table A1). As doctoral students had similar stay rates (see Table 1, ~70%) as master's but lower stay rates than bachelor's students (79%), it suggests that the higher number of doctoral students with a spouse and children (i.e., the influence of family ties) likely mitigated some of the decrease in probability graduation had on staying in Finland.

With employment, we found employment and employment in a white-collar job (a subset of employment) strongly increased the probability of staying across all three degrees compared to the reference group (i.e., not employed); though for bachelor's students (22% and 18%), the increase was lower than for master's (32% and 29%) and doctoral (27% and 31%). However, doctoral students had higher rates of employment of any type (white-collar or any employment, 84%) than master's and bachelor's students (75%, see Appendix Table A1). This suggests, similar to family ties, that the higher number of doctoral students employed (white-collar or any type) and employment's increase in the probability of staying likely mitigated the decreased probability graduation had on staying in Finland for doctoral students.

Additionally, recent research (Alho, 2020) found that international students searching for employment in Finland have limited understanding of and access to networks (professional and informal), and that these networks, particularly the informal, are extremely important in securing employment in Finland. This suggests international graduates, while having the requisite skills (i.e., completed degree) for the Finnish labor market, may not possess the necessary networks to find employment. As such, many of these students needing to go back to their home country or onto a third country for employment likely is a contributing factor to the decision to stay in Finland or not.

With master's students, graduation was not significant, suggesting graduation did not increase nor decrease the probability of staying or leaving Finland for these students. However, closer inspection of the degree logistic models (Table 4) shows that master's students in health and welfare (12%) and science (3%) fields had an increased probability of staying compared to the reference group (social sciences). This suggests that while master's students had similar stay rates (see Table 1, ~70%) to doctoral students, major choice did affect the probability of staying. This is important for two reasons. First, STEM education and subsequent retention of these graduates are a prerequisite for economic growth in the knowledge economy (European Commission, 2010; MEC, 2015a). STEM skills are associated with advanced technical skills, which are strong drivers of growth in knowledge economies (European Commission, 2015). Second, attracting and retaining international students is a way to augment the supply of needed skilled workers to maintain economic growth (European Commission, 2010). Finland has Europe's fastest aging population (Razvadauskas, 2016) and a need for an increased supply of highly skilled workers. The expected number of STEM job openings (i.e., the number of people needing to be trained for economic expansion and replacement demand) in 2025 is over 6.8 million in Europe and over 109,000 in Finland alone (European Commission, 2015).

In examining nationality of international students, students from non-EU European countries in all three degrees had an increased probability (9%–11%) of staying compared to the reference group (international students from EU countries). Additionally, bachelor's students from Asia (5%) and Africa (8%) had an increased probability of staying. This is important as bachelor's programs had higher rates of African (21% of all bachelor's, see Appendix Table A1) and non-EU European (24% of all bachelor's) students than master's (19% from Africa, 10% from non-EU European) and doctoral students (17% from Africa, 8% from non-EU European). Students from non-EU/EEA regions require a visa to study in Finland initially but are eligible for a visa extension to remain in Finland after graduation. The results from Table 5 show non-EU bachelor's students in technical and health and welfare fields had an increased probability of staying in Finland. Together these results suggest three things. First, non-EU European students (specifically), second, bachelor's students (in general), and third, bachelor's students in technical and health and welfare fields are most likely to benefit from the visa extension to search for employment after graduation. More work is needed to untangle the direct ties of the visa extension on stay rates and employment, but these findings suggest there is a relationship among these three groups.

Limitations and Future Research

There are limitations of this study to consider. First, this study was in a single country with a small number of international students. While the findings are not directly applicable to other countries' situations, the results are useable in comparison studies. Second, the estimated effect of family ties and employment status on staying might not be equal to the magnitude of the causal effect. The

capture of these variables was prior to graduation so they might only partially capture the effect of the unobserved motivation to stay in Finland after graduation. Ideally, an exogenous change in employment or family status of students would capture the magnitude of the causal effect.

Lastly, it is clear there is a need for more research on untangling the interactions between degree type, graduation, employment, and family ties. As the results show, a high percentage of nongraduates, particularly for bachelor's and master's, are staying well past the intended time to degree. One possibility to examine this is via visa data and the changes in individuals' status. The Finnish government has a clear goal of attracting and retaining international students due to their perceived benefits for economic development (Prime Minister's Office, 2015). As Finland recently introduced tuition fees in 2017 for non-EU/EEA students (MEC, 2015b), continuing to examine the role of graduation and governmental programs (e.g., visa extensions) on international students staying in Finland is vital for the sustained growth of Finnish higher education and its economic development.

CONCLUSION

The decision to stay in the host country by international graduates and settle is complex. National economies are becoming more intertwined and interdependent and as such, educating an increasingly international student population with competencies and transferable skills for a wide range of labor markets is critical (OECD, 2016). This article examined international students migrating to Finland and, in particular, the role graduation has on staying in Finland 5 years after the initial enrollment. Graduation is key for international students to compete for highly skilled employment and for non-EU/EEA students' eligibility for visa extensions after studying.

ISM theory (King & Sondhi, 2018; Mosneaga & Winther, 2013) argues that family ties, labor market opportunities, and policy (government and institutional) influence the decision of international students to stay in host countries after leaving their studies. Our results suggest that while there was an inverse relationship among graduation, degree type, and the probability of staying, family ties and labor market opportunities did increase the probability on staying across the board. While graduation is often a key metric in national policy and defining institutional quality (Matsudaira, 2015), our findings suggest host countries and HEIs should focus their policy efforts less on international student graduation but more on improving their ability to integrate into the host country's labor market and promoting an environment conducive for their families. Focusing on these aspects would likely produce higher rates of international students staying and contributing to host country's labor market and society.

NOTE

Appendices for this article can be found on the JIS website: https://www.ojed.org/index.php/jis.

REFERENCES

Alho, R. (2020). 'You need to know someone who knows someone': International students' job search experiences. *Nordic Journal of Working Life Studies, 10*(2), 3–22.

Caruso, R., & de Wit, H. (2015). Determinants of mobility of students in Europe: Empirical evidence for the period 1998–2009. *Journal of Studies in International Education, 19*(3), 265–282.

Choudaha, R., & de Wit, H. (2014). Challenge and opportunities for global student mobility in the future: A comparative and critical analysis. In B. Streitwieser (Ed.), *Oxford studies in comparative education series: Internationalisation of higher education and global mobility* (pp. 19–34). Symposium books.

Centre for International Mobility. (2011). *Key figures: Internationalization in Finnish higher education.* http://www.cimo.fi/instancedata/prime_product_julkaisu/cimo/embeds/cimowwwstructure/22370_Key_Figures_suojattu.pdf

Centre for International Mobility. (2014). *What do we know about the economic impact of international higher education students?* Facts Express 4B/2014. http://www.cimo.fi/instancedata/prime_product_julkaisu/cimo/embeds/cimowwwstructure/54162_30.11_Express4B_14.pdf

Centre for International Mobility. (2015). *What is the cost of education of international students?* Facts Express 2B/2015. http://www.cimo.fi/instancedata/prime_product_julkaisu/cimo/embeds/cimowwwstructure/55457_FactsExpress_2b_2015.pdf

Centre for International Mobility. (2016). *Suomessa, töissä, muualla? (In Finland, at work, elsewhere?).* Faktaa Express 1A/2016. http://www.cimo.fi/faktaa_express_1a_2016

European Commission. (2010). *Europe 2020: A strategy for smart, sustainable, and inclusive growth*. European Commission.

European Commission. (2015). *Does the EU need more STEM graduates?* European Commission. Report order 120/01 under framework contract DG EAC Lot 1 – No EAC 02/10.

European Parliament. (2016). *Directive on the conditions of entry and residence of third-country nationals for the purpose of research, studies, training, voluntary service, pupil exchange schemes or educational projects and au pairing*. Directive 2016/801. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016L0801&from=EN

Finnish Broadcasting Company. (2015). *How much do foreign students cost Finland?* March 27. http://yle.fi/uutiset/how_much_do_foreign_students_cost_finland/7895687.

Finnish National Agency for Education. (2017). *Ulkomaalaiset tutkinto-opiskelijat Suomessa* [*Foreign degree students in Finland*]. http://www.cimo.fi/palvelut/tilastoja_kansainvalistymisesta/korkeakoulut/ulkomaalaiset_tutkinto-opiskelijat

Hawthorne, L. (2018) Attracting and retaining international students as skilled migrants. In M. Czaika (Ed.), *Highly-skilled migration: Drivers and policies* (pp. 195–221). Oxford University Press.

Heikkilä, E. (2012). Labour market participation of immigrants in Finland and its regions. Paper give at *The European Social Science History Conference*. Glasgow, Scotland. http://www.migrationinstitute.fi/files/pdf/artikkelit/labour_market_participation_of_immigrants_in_finland_and_its_regions.pdf

Jokila, S., Kallo, J., & Mikkilä-Erdmann. (2019). From crisis to opportunities: Justifying and persuading national policy for international student recruitment. *European Journal of Higher Education, 9*(4), 393–411.

Kärkkäinen, K. (2017). Learning, teaching and integration of adult migrants in Finland. In *Jyväskylä studies in education, psychology and social research*. https://jyx.jyu.fi/handle/123456789/55745

King, R., & Raghuram, P. (2013). International student migration: Mapping the field and new research agendas. *Population, Space, and Place, 19*(2), 127–137.

King, R., & Sondhi, G. (2018). International student migration: A comparison of UK and Indian student's motivations for studying abroad. *Globalisation, Societies and Education, 16*(2), 176–191.

Marginson, S. (2012). Including the other: Regulation of the human rights of mobile students in a nation-bound world. *Higher Education, 63*(4), 497–512.

Mathies, C., & Karhunen, H. (2020). Suomeen valmistumisen jälkeen jääneet tutkinto-opiskelijat tilastojen valossa. (International degree students after graduation in Finland: A view from statistics). *Kotoutumisen kokonaiskatsaus 2019 (Comprehensive overview of integration 2019)* (pp. 73–82). Ministry of Economic Affairs and Employment.

Mathies, C., & Karhunen, H. (2021). Do they stay or go: International student migration in Finland. *Globalisation, Societies and Education*, *19*(3), 298–310.

Matsudaira, J. (2015). Appendix C: Defining and measuring institutional quality in higher education. In K. Matchett, M. L. Dahlberg, & T. Rudin (Rapporteurs) (Eds.), *Quality in the undergraduate experience: What is it? How is it measured? Who decides? Summary of a workshop* (pp. 57–80). National Academies Press. https://www.nap.edu/read/23514/chapter/10#80

Ministry of Education and Culture. (2009). *Strategy for the internationalisation of higher education institutions in Finland 2009–2015*. Author.

Ministry of Education and Culture (2015a). *Towards a future proof system of higher education and research in Finland*. 2015:11. Author.

Ministry of Education and Culture. (2015b). *Hallituksen esitys eduskunnalle laeiksi yliopistolain ja ammattikorkeakoululain muuttamisesta* [*Government proposal to parliamentary law amending the universities act and universities of applied sciences act*]. HE 77/2015 vp. Author. http://www.finlex.fi/fi/esitykset/he/2015/20150077.pdf

Ministry of Higher Education and Science. (2018). *More international graduates must stay and work in Denmark*. Press Release. https://ufm.dk/en/newsroom/press-releases/2018/more-international-graduates-must-stay-and-work-in-denmark

Ministry of Interior. (2013). *Government resolution on the future of migration 2020 strategy*. Author. https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/80059/Maahanmuuton_tulevaisuus_2020_en.pdf

Ministry of Interior. (2018). *Legislation on students and researchers outside the EU to be amended*. Author. https://intermin.fi/en/article/-/asset_publisher/eu-n-ulkopuolelta-tulevia-opiskelijoita-ja-tutkijoita-koskevaa-lainsaadantoa-muutetaan

Mosneaga, A., & Winther, L. (2013). Emerging talents? International students before and after their career start in Denmark. *Population, space, and place, 19*, 181–195.

Nuffic. (2016). *Welcome to work! On retention of international students in the Dutch labour market*. Netherlands. https://www.epnuffic.nl/en/publications/find-a-publication/welcome-to-work.pdf

Organisation for Economic Co-operation and Development (2011). How many international students stay on in the host country? *Education at a glance 2011*. OECD Publishing.

Organisation for Economic Co-operation and Development. (2016). *Trends shaping education 2016*. OECD publishing.

Prime Minister's Office. (2015). *Ratkaisujen Suomi [Solutions for Finland]*. https://valtioneuvosto.fi/documents/10184/1427398/Ratkaisujen+Suomi_FI_YHDISTETTY_netti.pdf.

Razvadauskas, F. (2016). Ageing cities: Finnish cities lead population ageing across Europe. *MRX Blog.* Euromonitor International. https://blog.euromonitor.com/2016/11/ageing-cities-finnish-cities-lead-population-ageing-across-europe.html

Riaño, Y., Van Mol, C., & Raghuram, P. (2018). New directions in studying policies of international student mobility and migration. *Globalisation, Societies and Education, 16*(3), 283–294.

Robertson, S. (2013). *Transnational student-migrants and the state*. Palgrave-MacMillan.

Saarinen, A. (2011). Non-work migration, employment and welfare in Finland: Three ten cases and four phases of immigration policies. In M. Pajnik & G. Campani (Eds.), *Precarious migrant labour across Europe* (pp. 145–170). Mirovni institute.

Shumilova, Y., Cai, Y., & Pekkola, E. (2012). Employability of international graduates educated in Finnish higher education institutions. *VALOA-project.* University of Helsinki. http://www.helsinki.fi/urapalvelut/valoasurvey/#/1/.

Tran, L.T.N. (2014). *International student migration to Norway: Who stays and who leaves?* Masters thesis, department of Economics: University of Oslo.

Ziguras, C., & Law, S. (2006). Recruiting international students as skilled migrants: The global 'skills race' as viewed from Australia and Malaysia. *Globalisation, Societies, and Education, 4*(1), 59–76.

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