International Student Migration to Norway

Who stays and who leaves?

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Abstract

International student migration to Norway has markedly increased during the past 20 years. This inflow has caused the Norwegian authorities to shed light on the topic. Until 2001, it was expected from the Norwegian authorities that international students return home after graduation. After the 21th century several policy changes occurred to attract more international students to Norway, and making it easier for international students to obtain a work permit after their studies.

This thesis analyzes international student migration to Norway between 1990 and the 2010, and discusses the policy changes that might have contributed to the increase in student mobility to Norway. In addition, with a comprehensive dataset I analyze whether an international student will remain in Norway or return home.

I find that the increased student mobility is likely due to positive education policies and increased tuitions fees in other European countries. Further, I investigated the probability for an international student to remain in Norway for at least 5 and 10 years. My findings show significant differences in decisions to stay depending on economic conditions in the source country, education level, gender and marital status.

Preface

This thesis is written under the research project 1392: “Labor Immigration to Norway” at Frisch Centre for Economic Research, with Bernt Bratsberg as my supervisor. The empirical analysis is based on micro data made available by Statistics Norway.

I would to like thank my supervisor for his time spent on remarks, suggestions, support and his valuable help in programming. And thanks to the Frisch Centre for providing me office place and including me in their working environment.

While writing this thesis I would also like to Thank Mari Holden and Bjørn Dapi for kindly spent their time to answer my big and small questions.

Lastly, my greatest gratitude goes to my family. Everything I have accomplished is due to you.

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1 Introduction

According to the Organization for Economic Co-operation and Development (OECD), nearly 4,3 million students were enrolled in tertiary education outside their country of origin in 2011, and the number of international students more than doubled between 2000 and 2011 (OECD, 2013). During the late 1990's, several OECD countries relaxed their immigration laws (including Norway) to attract qualified foreigners, including students. This change led to new perspectives on student migration, that is, studying abroad can be a part of deliberate immigration strategy (Tremblay, 2005).

In the past 20 years, the Norwegian authorities shifted their attitudes towards international students, from a strong focus on return to recognition of the potentially positive effects of student immigration. From a development aid and migration control policy point of view there has been a strong stress on return among international students. Reasons include avoiding brain drain[1], because it is believed that competence acquired in Norway should benefit the source countries. In addition, Norwegian authorities did not want international students to misuse student immigration as a way to obtain permanent residence in Norway (Brekke, 2006).

On the other hand, education-, and labor market policies have recognized the potential positive effects of international students staying in Norway. Due to globalization and competition, knowledge and research must be considered on a global scale, rather than nationally. International students can contribute new perspectives and improve the quality of higher education (Department of Education and Research, 2000-2001). Experience has shown that being a member of European Economic Area (EEA) did not contribute to increased labor immigration. Therefore a concrete policy change was made in Norway in 2001, the abolishment of the *Quarantine Provision*[2] which made it easier for international students to remain in Norway by giving them the right to apply for work residence after ended studies in Norway (Department of Finance, 2000-2001).

[1] The term brain drain can be interpreted as human capital is flowing out of developing economies where it can make the greatest contribution to human welfare and into developed economies (Adams, 1968, p. 1)
[2] Issued by the Ministry of Labor and Social Affairs.

The Agency for Public Management and eGovernment (DIFI, 2008), reports that there is a shortage of high-skilled workers in Norway, and that international students are an unexploited resource because many students would like to remain in Norway after their studies. However, the regulations in Norway make it difficult for them to find work.

The field regarding international students has been given relatively little attention in the topic of migration policy in Norway. Statistics Norway reports that Norway has experienced a growth in student migration the past 20 years, and while Norway has kept the "principle of free education"[3], our neighboring countrie have introduced tuition fees in the past years (Tronstad and Andreassen, 2013). This act may have contributed to the strong growth since 2008.

With positive education-, and relaxed immigration policy towards international students, this thesis will study international student migration and their decision to stay or leave Norway. I will analyze this by examining trends in international student immigration to Norway the past two decades, and by performing an empirical analysis using pooled cross sectional data on international students in Norway to investigate the determinants behind a student's decision to stay.

1.1 Structure of the study

The first chapter outlined above, gave a brief introduction to the unclear politics concerning international students and research question(s). The remainder of the study is organized as follows:

Chapter 2 covers Norwegian and international literature on the topic of international student migration and followed by possible reasons behind the increase in number of international student migration to Norway. Chapter 3 deals with data sources and constraints for the empirical analysis, and chapter 4 provides descriptive statistics.

Chapter 5 presents the Roy Model as a theoretical framework behind a student migration. Chapter 6 outlines the selection and construction of the variables for the empirical analysis

[3] Norway has no tuition fees at public institutions. Costs are covered by the Ministry of Education and Research.

and the empirical specification. Chapter 7 presents the results, determinants behind a student staying decision. And finally, chapter 8 draws a short conclusion.

2 Background

With the increased inflow of international student migration after 21th century, the issue of international students has recently been explored in detail. The report *International students and immigration to Norway* by Brekke (2006), highlights the ambivalence of Norwegian welfare state when it comes to student migration. By using the policy change in 2001, the Quarantine Provision as a reference point, the author analyzed the immigration effect by comparing the number of graduates each year (between 1991 and 2005), to the number of graduates who renewed their resident permit. He found an increasing number of graduates each year, but the number of resident permits granted to students after graduation remained constant each year, i.e. the Quarantine Provision had no effect. In addition, the author conducted a web-based survey distributed to the University of Oslo (UiO), the University of Stavanger (UiS) and University College Narvik (HiN). The survey showed that on average, 12 percent of the students who remained in Norway after the ended period of study remained in Norway because of work-, or family related permits, but the actual interest in staying in Norway was much higher. Fully 47 percent of the survey participants expressed they had plans to remain in Norway after graduation.

In 2005, a Norwegian research study was conducted regarding out-migration among immigrants in Norway (Bratsberg, Edvarsen, Raum and Sørlie, 2005). Even though international students were not the main topic, the results from an analysis of time span between 1988 to 1994 showed that most students return home, but 25 percent of the students remained in Norway ten years after they arrived.

Two recent reports from Fafo (Bore, Djuve, Tronstad, 2012) and Statistics Norway (Dzamarija, 2013) showed that international students usually leave Norway within a few years of residency. However, many remain, according to Fafo's calculation, from a period of 2000 to 2010, they found that 1/5 of the cohort who migrated in year 2000 were still residents in Norway eleven years later. Statistics Norway (2013) looked at a longer period from 1990-2011 and found that 1/3 of all of those who migrated to Norway with study as reason for immigration were still residents in Norway 10 years after their arrival. Since a

study permit do not automatically grant residence permits, this means that the students were likely issued a new resident permit on another basis.

Because sending countries might suffer the adverse effects of brain drain (Adams, 1968), the non-return home of international students have long been a topic of debate outside of Norwegian border. Due to the growing international student mobility and relaxed immigration policy towards international students the past decade, Tremblay (2005) and Gribble (2008) discuss the possible benefits of student mobility. From an education perspective, student migration to developed countries is positive when their home country cannot meet the demand for tertiary education, and after their return they maintain close relations with the countries they study in. For the source countries, whether this is beneficial depends on whether the migration was temporary or not. Source countries are potentially at risk losing human capital if a student would rather participate in the host country's labor market rather than return with expertise to their home country.

Bratsberg (1995) contributes to the field by focusing on the staying rate of non-return among foreign born students in US, and by applying empirical analysis based on a theoretical migration model to determine the return decision of a foreign student. He finds the decision to return is determined by differences in economic and political conditions between the source and host countries.

While there has mostly been descriptive research on international student migration to Norway, my thesis will contribute an empirical analysis relying on micro data using similar approach as Bratsberg (1995). By combining several datasets, the data will provide us with a student accurate time of entry and time of out-migration from different source countries. With additional information about the economic conditions in the source country, my empirical analysis will investigate what determines a student’s stay/return decision.

2.1 Why Norway as a study destination

This section describes possible reasons for the increase in student migration to Norway. We cannot ignore that students have subjective reasons for choosing Norway as a study destination, qualitative interviews have been conducted to cover this information. Reasons

for choosing Norway are different for students from developing-, and developed countries. Students from development countries put more weight the financial side, the availability of scholarships, no tuition fees, and the possibility of working part time as one of the most important reasons for choosing Norway. While students from western countries put less weight on educational reasons and more on aspirations such as love and family reunion. However, both groups considered Norwegian nature and the possibility of study programs in Norway to match their previous education and no tuition fee as important factors (Teshnar, 2009; Brekke, 2006). For three years in a row, the Norwegian Centre for International Cooperation in Education (SIU), performed reputation survey among international students in Norway (SIU, 2013). These surveys confirm that English language instruction, high quality in education and research, and lack of tuition fees are important factors for choosing Norway.

It is difficult to distinguish reasons why international students choose to study in Norway above other countries. It can be the case of exchange and cooperation programs between Norwegian and international institutions, but since these agreements exists in other countries as well, they are not taken into account of a student's decision to choose Norway as a study destination (Wiers-Jenssen 2012). The rest of this chapter will contain intended politics that might have contributed to the increase in student migration to Norway.

2.1.1 Changes in the education system

Several changes have occurred in the educational structure in Norway during the past 25 years. It started from the government green paper nr.13 *Learning without borders, receipt of foreign students, student exchange and internationalization* (1989), which stated that there should be a political aim to increase the number of international students, and that the field of international students is unorganized without government control. Among the initiatives mentioned was encouraging educational institutions to internationalize the teaching programs by providing study programs in English, making the degree system in Norway more convertible to the international degree system, and establish a national institution for organization of international students. These requests were taken into account 10 years later.

Internationalization of higher education in Norway started formally in 1999 in Bologna, where with 28 other European countries, the Norwegian minister responsible for higher education signed the Bologna declaration, "The European Higher Education Area". The purpose of the convention was to increase academic mobility and make the European educational institutions more competitive. According to the government green paper nr.14 *Freedom with responsibility, about higher education and research in Norway* (2000), by signing the Bologna declaration, Norway agreed to adapt a new grade and character system and international diploma supplement for all universities and college graduates. The new grade and character system would then be more compatible with other countries and therefore make it easier for student and staff to mobilize within Europe, and hence made it more difficult to non-European countries to attract students.

In line with the Bologna Process, the higher education system in Norway was going through an extensive reform in 2001, namely "The Quality Reform" (Department of church, Education and Research, 2000-2001). Because quality of education and research should not be measured at national levels but rather international, one of the important aim of the Quality Reform was to increase the quality of education and research through internationalization. Internationalization in this setting not only meant increased student and staff mobility, but it also more cooperation between Norwegian educational institutions with international institutions. Hence, the institutions were granted more autonomy to be head responsibility over providing courses held in English and academic cooperation for student exchange programs between countries.

To facilitate organization and improvement of the cooperation between educational institutions with international institutions, the Norwegian Centre for International Cooperation in Education[4] (SIU) was established in January 2004, from the Norwegian Association of Higher Education Institutions. SIU are responsible for promoting the participation of Norwegian educational and research institutions in international cooperation.

[4] To read more about SIU, visit website: www.siu.no

The Quality reform was implemented in 2003, with a new degree-, and grade system. This system, the European Credit Transfer System (ECTS)[5], made it easier for student and staff exchange credits between institutions. Also in 2008 internationalization was further taken into account when the Department of Education and Research stated that Norwegian students and staff in Norway should be exposed for international impulses.

Internationalization of the education system in Norway facilitated education for international students, which created an increase in student immigration to Norway. Status report from the Department Education and Research (2012), report that from 2009-2011, there has been a doubling (from 15 to 31) of joint degrees developed by Erasmus Mundus[6]. In addition, the report states courses in English (mainly provided) by the universities have more than doubled.

2.1.2 Changes in the funding system

Inspired by the Danish system (Maasen, Nokkala and Uppstrøm, 2004), the funding system (result based payment) was changed based on the Quality Reform, which granted the institutions a fixed sum per incoming and outgoing student within an exchange program. This change might have created an economic incentive for student mobility between the national and international education institutions, and increased competition between the institutions in Norway (Department of Education and Research, 2007-2008; Wiers-Jenssen, 2012).

2.1.3 Tuition fee

Several countries have acknowledged the economic revenue of international students by charging them full costs of education or differentiated tuitions fees. Norway on other hand does not charge tuition fees for international students. The "principle of free" still maintains because the Norwegian educational system is based on principle of equal rights to life-long learning for everyone (Department of Education and Research, 2006-2007). Tuition fees form an important factor determining choice of study destination for non-English countries.

[5] To read more about ECTS, visit website: http://ec.europa.eu/education/tools/ects_en.htm
[6] Erasmus Mundus is EU's program for education. From 23.05.2014 Erasmus+ will replace Erasmus Mundus. To read more, visit website: http/ec.europa.eu/programmes/erasmus-plus/index_en.htm

A combination with fee tuition and (increasing) availability of study programmes in English explains partly the increased growth in Norway (OECD, 2013).

This is further supported by the case in Sweden. When they introduced tuition fees (for non-EU/EEA students) in 2011, the number of international students decreased with 30 percent (Swedish Higher Education Authority, 2013). However, Denmark became the first Nordic country to introduce tuition fees for non-EU/EEA students in 2006. Denmark experienced a decline in students from Asia, but this decline was compensated by an increase in students from Africa. Overall, the number of international students in Denmark maintained fairly constant. This was likely due to the great variety of scholarships and greater effort in marketing the programmes in the international market (Nordic Council of Ministers, 2013).

2.1.4 Scholarships

Because living expenses in Norway are higher than in many other countries a variety of scholarships[7] are offered by the national programmes. The most favorable one is perhaps the *Quota Scheme*. Each year 1100 students at master-, and Ph.D level from developing countries (800 from developing countries, 300 from Eastern Europe and Central Asia) are granted a loan that will cover the costs of living in Norway, distributed by the Norwegian State Educational Loan Fund ("Lånekassen"). The loan will be cancelled if the student returns home and stays there for at least 1 year. The main reason for this scholarship is to provide development aid help for developing countries and to attract students from developing countries, providing them opportunities to attain higher education in Norway and return home with their competence. Other scholarships worth mentioning are Erasmus Mundus (students from EU/EEA), High North Fellowship Program (students from Canada, Japan, South-Korea, Russia and US), and Science without borders, which offer scholarships to Brazilian students at master-, and Ph.D level to study in higher education institutions in Norway.

[7] More information about scholarships, visit website: http://studyinnorway.no/Tuition-Scholarships/Scholarships

2.1.5 Labor and Immigration policy

According to Trembley (2005) several OECD countries has relaxed their immigration policy to attract highly qualified foreigners, including students studying sectors where there is a labor shortage. The Quarantine Provision which prevented international students from applying for residence permit for work purposes in Norway was repealed in October 2001 (Deparment of Labor and Social affairs, 2007-2008).

The Quarantine Provision prevented foreigners with study permit in Norway from applying for a work permit before the student had moved out of Norway for at least 5 years. The main reason for the provision was to avoid brain drain, and avoid misuse of study permit as a way to obtain permanent residence. However, conclusions were drawn that the authorities cannot control whether a student returns home, or migrates to a third country. Therefore there is no reason to prohibit qualified student migrants who has obtained a Norwegian education to participate in the Norwegian labor market, when they participate in other countries. Since there were insecurities regarding the effectiveness of the Quarantine Provision, it was repealed and international students were granted permission to apply for work permit[8] in Norway.

Not only are students now allowed to apply work permit after ending studies, they are also allowed to work part time (20 hours per week, and full time in the holidays) while studying (UDI, 2014). The possibility to work part time was mentioned to be an attractive factor for choosing Norway was a study destination from the qualitative interviews.

[8] After ended studies, students have the right to remain in Norway within 6 months to find a job, beyond the deadline, without a legal employment contract, they must leave Norway (UDI, 2010)

3 Data

My analysis is mainly based on three micro datasets originating from administrative registers in Statistics Norway. The datasets are designed in such a way that they are matching registers, using personal identification numbers to connect comprehensive individual information for the whole populations of immigrants in Norway.

3.1 Definitions and constraints

Before presenting the data sources, it is important to distinguish between foreign students and international students. According to OECD (2013), international students are those who cross borders for the purpose of study, while foreign students are defined according to their citizenship. There has been a challenge in the statistics to separate the number of foreign students who came to Norway for the purpose to study (international students) and students who came to Norway for other reasons than studies (SIU, 2009). In this study, my sample will consist of only international students.

Four problems should be mentioned about my sample. First, because Nordic citizens do not need to apply for residence permit or register at a police station, they do not need to inform reasons for immigration to the Norwegian Directorate of Immigration (UDI), therefore information is not available. The second problem is EU/EEA citizens who are planning to stay in Norway for more than 3 months, can live in Norway without applying for a residence permit, as long as they register with the police (Registration scheme). The third concern is UDI's register reason for immigration. The statistics not only include students who are granted study permit based on admission to an officially recognized educational institution at college or university level, but also Au pairs and high skilled workers who want to learn Norwegian.

3.2 Data sources and sample extraction

The first data source is Statistics Norway's event database (Forløpsdatabasen FD-trygd), which includes details such as country of origin, immigration status, date of first arrival in

Norway, residents, and marital status. The second data source is National Education Database (NUDB), which contains all individually based statistics on education. The third data source is UDI's database for Reason for Immigration[9].

To isolate my sample, I first extract records for all foreign-born individuals who are registered at education level from secondary[10] to tertiary education from the education database between 1990 and 2010. Using personal identification numbers, these records are then matched to Statistics Norway event database to individuals who are first generation immigrant (born abroad with two foreign parents). Lastly, I extract all individuals who are registered as study as reason for immigration[11] and those who do not need to register reason for immigration to UDI between year 1990-2010.

To solve my sample problem, I keep individuals who are foreign-born and migrated to Norway with study as reason for immigration, together with those who do not need to register reason for immigration at UDI, and simultaneously registered at educational institution within one year since the year of immigration between the period 1990 to 2010.

Data on economic variables in the sending countries are issued by the World Bank database. The dataset contains data for 140 countries. The last data source is data on return to educations in the source country, estimated by George Psarcharopoulos and Harry Anthony Partinos (2004). This dataset only contains data for 84 countries.

3.2.1 Possible problems

Data on reasons for immigration may have errors, mostly in the early 1990's. However, errors should not have a severe impact on result (Statistics Norway, 2013). The second problem is that my sample might contain foreign students who did not come to Norway with the purpose of study. For instance there might be students from Sweden who primarily came to Norway to work and during their stay within that year, they decided to pursue

[9] Data originate from the Norwegian Directorate of Immigration (UDI), and delieverd by Statistics Norway.
[10] I included students at secondary level for my empirical analysis to investigate if education level affects a student staying decision.
[11] Immigrants by reason for immigration are divided into 5 categories: Labor, Family, escape, education and other. More information about the statistics, visit website: http://www.ssb.no/en/befolkning/statistikker/innvgrunn/aar/2013-09-03?fane=om#content

higher education at a Norwegian institution, creating a higher number of international students.

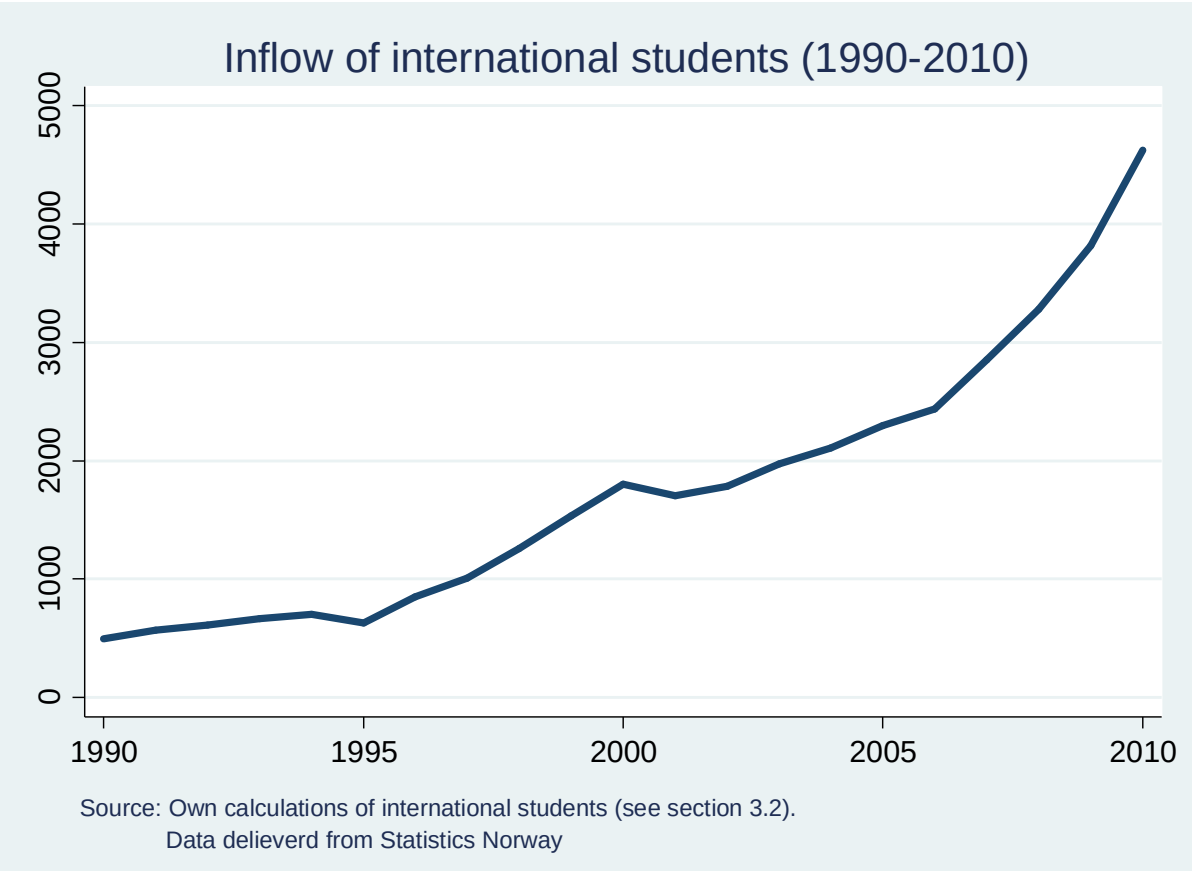
4 Descriptive statistics

Before analyzing a student's staying decision, this section will cover a description of inflow of international student migration to Norway the past two decades. Chapter 4.1-4.2 will analyze trends in international student migration, and chapter 4.3 will analyze the fraction of international students remaining in Norway.

4.1 International student migration to Norway, 1990-2010

Figure 4.1 illustrates the inflow of international students to Norway in a 20-year period. The line measures the annual student immigrant arrivals, and as we can see there has been a steady and strong growth of student inflow since 1990.

Figure 4.1 Inflow of international students between 1990-2010.



Source: Own calculations of international students (see section 3.2).
Data delieverd from Statistics Norway

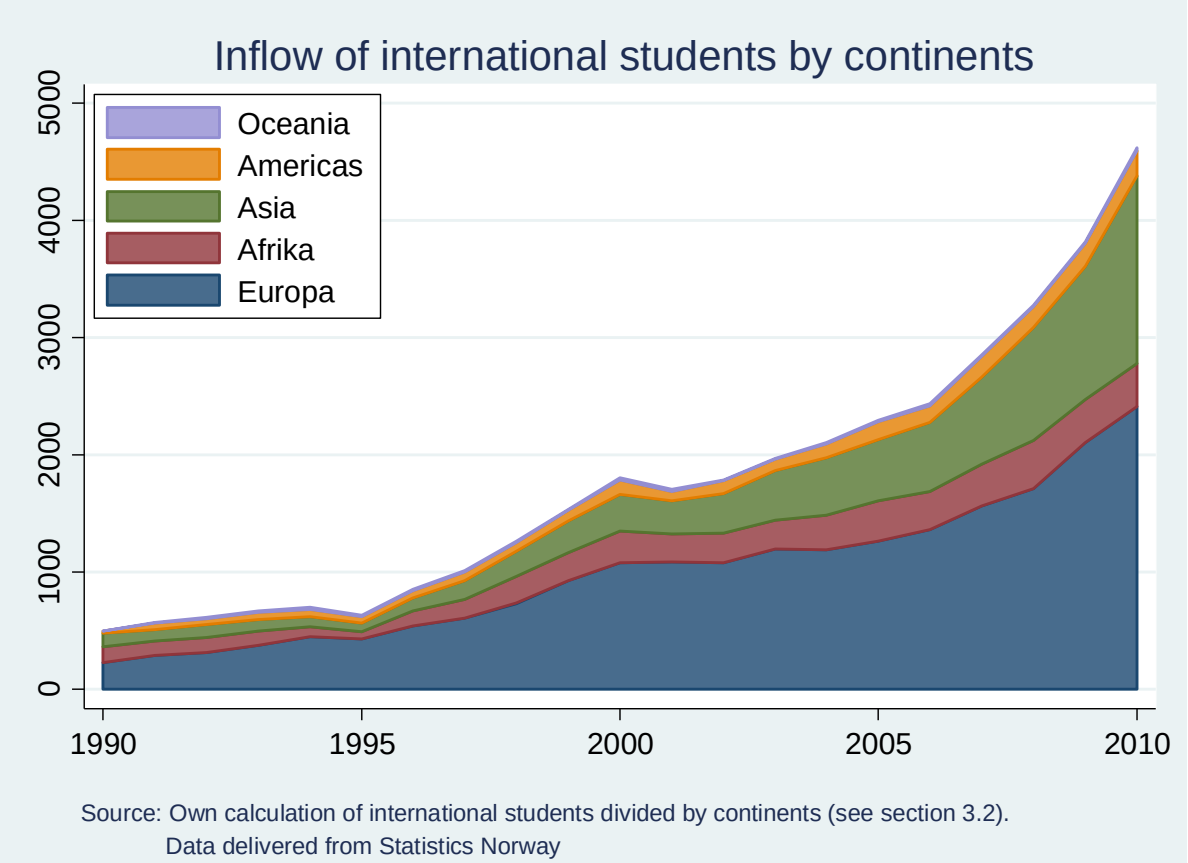
In 2010, 4619 international students came to Norway, compared to only 495 in 1990. Until 1995, Norway experienced moderate growth and after a small decline in 1995 (mainly due to decline in students from Asia and Africa), the growth steadily increased. In 1992, Norway gained membership into Erasmus Mundus[12], and in 1994 Norway became officially member of EEA[13] which contributed to increased mobility between students in Europe.

As it takes time for political policies to have an effect, the combination of the Bologna-declaration, Quality Reform, increased study programmes offered in English, and the amend of Quarantine Provision, led to a large increase in 2006 and on onwards. This increase was not only due to Norwegian conditions but also changes in the educational system in Denmark which eased the competition for international students (Nordic Council of Ministers, 2013).

Figure 4.2 Illustrate the inflow of international students divided by continents. Perhaps the most interesting with this pattern is the composition of students between the continents slightly after 2005.

[12] Erasmus Mundus is EU's educational program for life long learning (LLP). Erasmus Mundus will be replaced with Erasmus^{+} in May 2014.
[13] With the membership in EEA gives free mobility of goods, services, labor and capital within EU/EEA (four freedoms). Education is seen as the fifth freedom of mobility (Ministry of Foreign Affairs, 2012).

Figure 4.2 Inflow of international students by continents between 1990-2010



Source: Own calculation of international students divided by continents (see section 3.2).
Data delivered from Statistics Norway

Though students from Europe represent more than half of the student mass, we see an increasing inflow of students from non-EU/EEA, especially from Asia after 2006. This pattern might not be a coincidence as Denmark introduced tuition fees for higher education in 1.August.2006 for international students outside from EU/EEA, Denmark experienced a decline in international students from Asia (the number of international students maintained constant as Denmark experienced a higher number of students from Africa). This implies that Norway attracted some of the students from Asia who might otherwise have chosen Denmark (Nordic Council of Ministers, 2013).

Table 1 gives a detailed summary and a further background on international student migration pattern to Norway, by gender, continents, and age.

Table 1. Number of international students in Norway between 1990-2010 by gender, education level, age at immigration and year.

Year	1990	1995	2000	2005	2010	Total (1990-2010)
Total Students	495	631	1803	2297	4619	37017
Gender						
Female	227	347	976	1387	2669	20592
Male	268	284	827	910	1950	16425
Continents						
Africa	136	61	269	343	368	4869
Asia	113	75	309	525	1601	8733
N. America	11	44	78	92	134	1451
S. America	6	10	47	61	85	741
Oceania	0	11	17	13	22	260
Education level						
Secondary level	8	110	245	192	748	4772
End of secondary level	118	58	263	27	29	1848
Bachelor level	212	275	607	990	1978	14973
Master level	56	159	643	989	1763	13950
Ph.D level	20	32	45	99	101	1474

(Table continues on the following page.)

Table 1 (continuted)

Age at immigration						
>18	18	34	74	12	42	931
18-45	475	591	1710	2267	4548	35759
<45	2	6	19	16	27	327

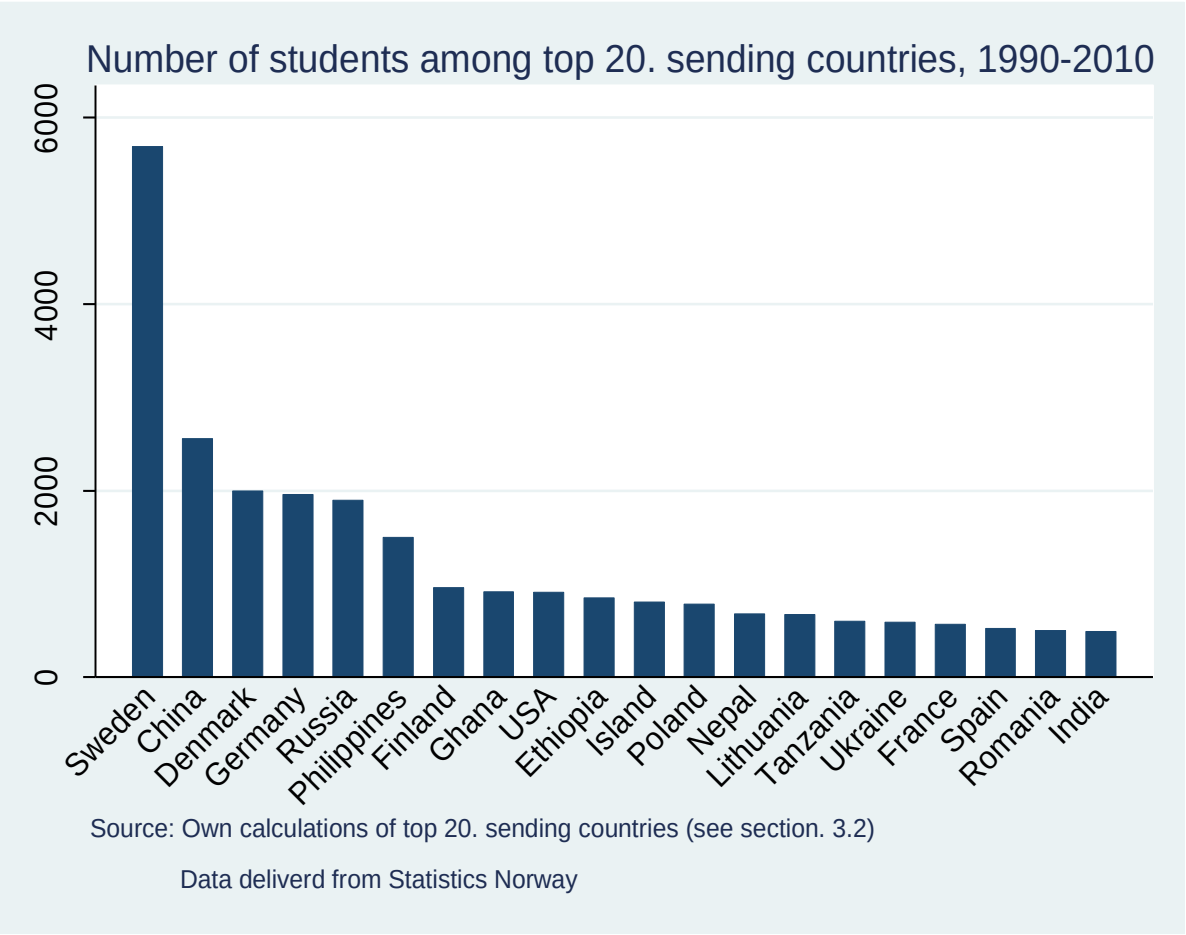
Source: Own calculation of international students, see section (3.2). Data delivered from Statistics Norway.

The mass of international students who came to Norway between period 1990 to 2010, comes from 180 different countries. Around 56 percent of the students have background from Europe, 24 percent have background from Asia, 13 percent consists of Arican students, and only 6 and 1 percent have background from America and Oceania respectively.

Figure 4.3 shows the number of students among the top 20 sending countries throughout the period 1990 to 2010. Not surprisingly, Swedish and Danish students one of the largest groups of students in Norway, partly due to cooperation with Nordic Council and the Scandinavian language. Together with Russian students, Chinese students are one of the largest groups of students in Norway. This can be seen in light of the fellowships program BRIKS[14], where there is a high priority in cooperation between Norwegian and Chinese and Russian education institutions. As we see in figure 4.3 a great diversity of nationalities are represented in Norwegian higher education. By closer examining the data, among the countries that have had the largest relative growth since 2000 are Philippines, Poland and Nepal.

[14] BRIKS Fellowship program includes Brazil, Russia, India, China and Eurasia.

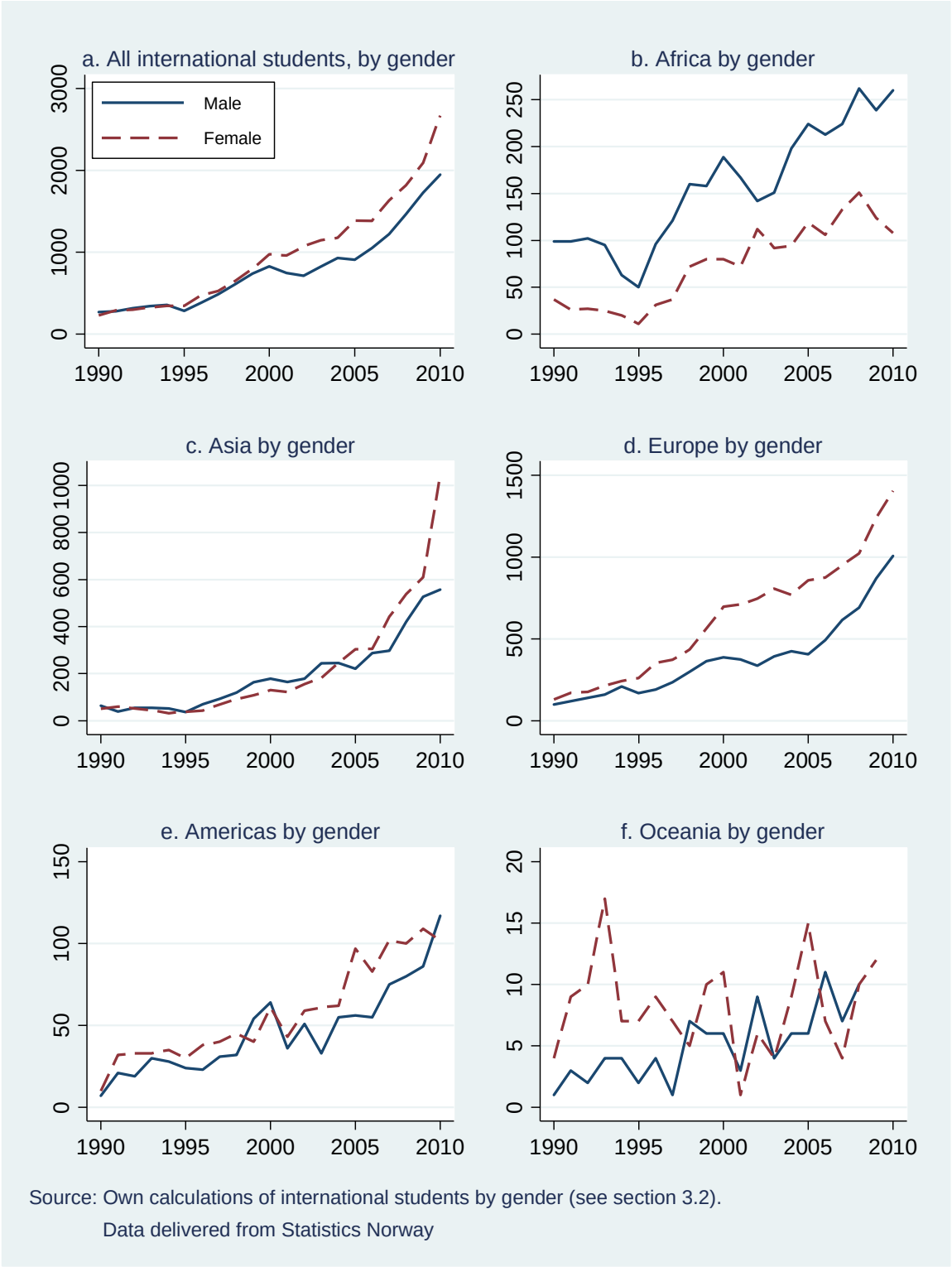
Figure 4.3 Number of students among top. 20 sending countries, 1990-2010



4.1.1 International student migration to Norway, by gender (1990-2010)

The gender composition is somewhat balanced, with slightly more female than male students. Around 56 percent of the international students are women. Figure 4.3 panel a. shows the gender division for all students. The split started slowly in 1995 and remarkably divided around 2000.

Figure 4.4 Inflow of international students dividedby gender between 1990-2010



Source: Own calculations of international students by gender (see section 3.2).
Data delivered from Statistics Norway

There are large differences in the gender mix between the continents. Panel b, c, d, e and f of figure 4.3 shows the gender division by continents. The panel shows that the largest differences in male and female immigration pattern are students from Africa, Europe, Oceania and Asia. By first looking at non-western regions, male students from Africa have dominated throughout the period, while there has been a change in the gender division of students from Asia. Up until 2005, male students from Asia have slightly dominated. After 2005, the gender composition changes with increased number of women compared tomen. It is worth noticing that, in the 2010, twice as many female students migrated to Norway than male students. This is partly due to the high proportion of female students from Philippines. Contrary to Africa, female students from Europe have dominated in the entire period, especially after 8 new countries gained membership in 2004.

Table 2 gives a more detailed description of the figure 4.4

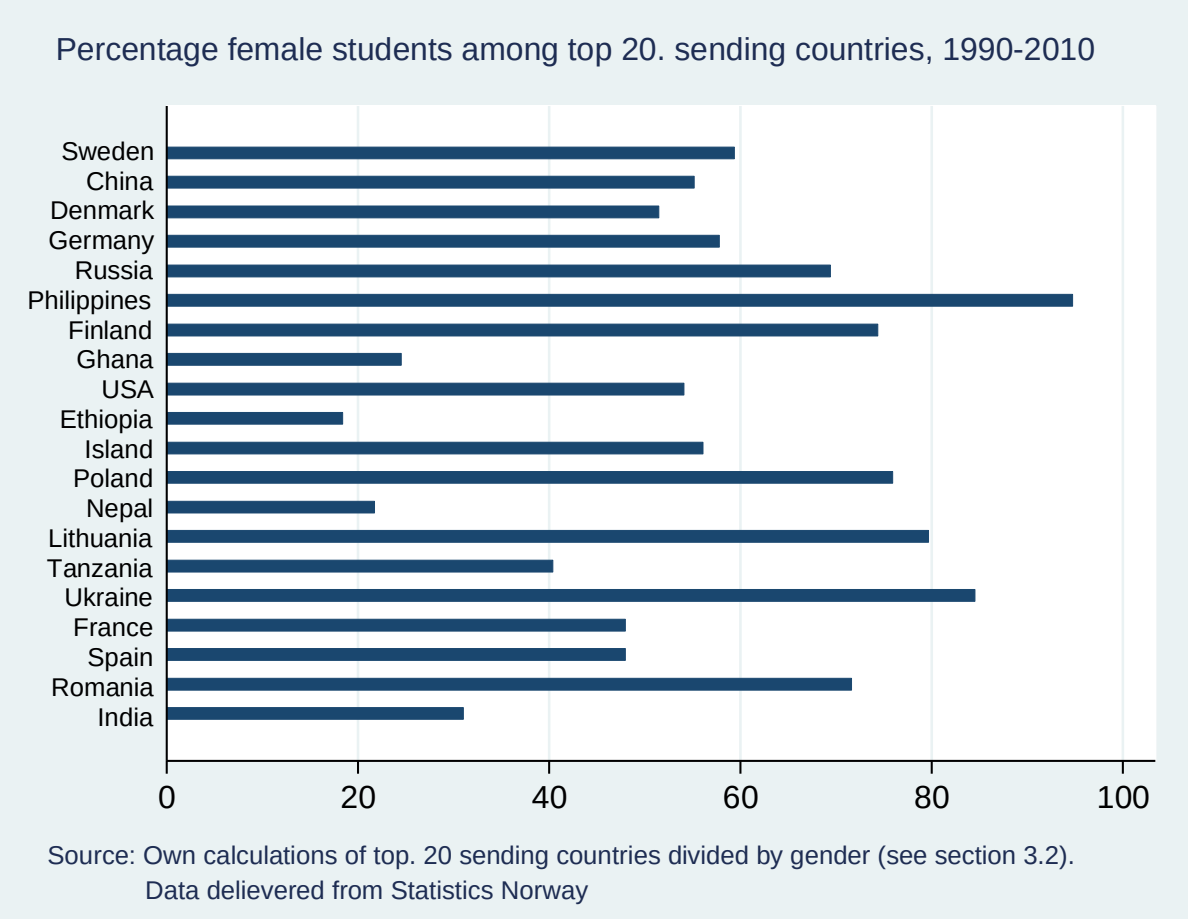
Table 2. Gender division, by continents and average age at immigration (1990-2010)

	All countries	Africa	Asia	Europe	N. America	S. America	Oceania
Female (%)	55,63	31,98	46,56	61,96	46,18	58,57	63,08
Male (%)	44,37	68,2	53,44	38,04	53,82	41,43	36,92
Average age of immigration	25,7	29,4	26,2	24,8	24,4	24,8	21,6
Average age of immigration (Female)	24,8	28,3	25,4	24,42	23,6	24,6	21,0
Average age of immigration (Male)	26,7	29,9	27,1	25,5	25,2	25,2	23,0

Source: Own calculation of international students, see section (3.2). Data delivered from Statistics Norway.

Figure 4.5 Shows percentage female students among top 20 sending countries between 1990 and 2010. As we can see figure 4.5 shows that Eastern-European countries such as Poland, Ukraine and Russia have had some of the largest growth, sending excess of female students each year.

Figure 4.5 Percentage female students among top. 20 sending countries from 1990-2010



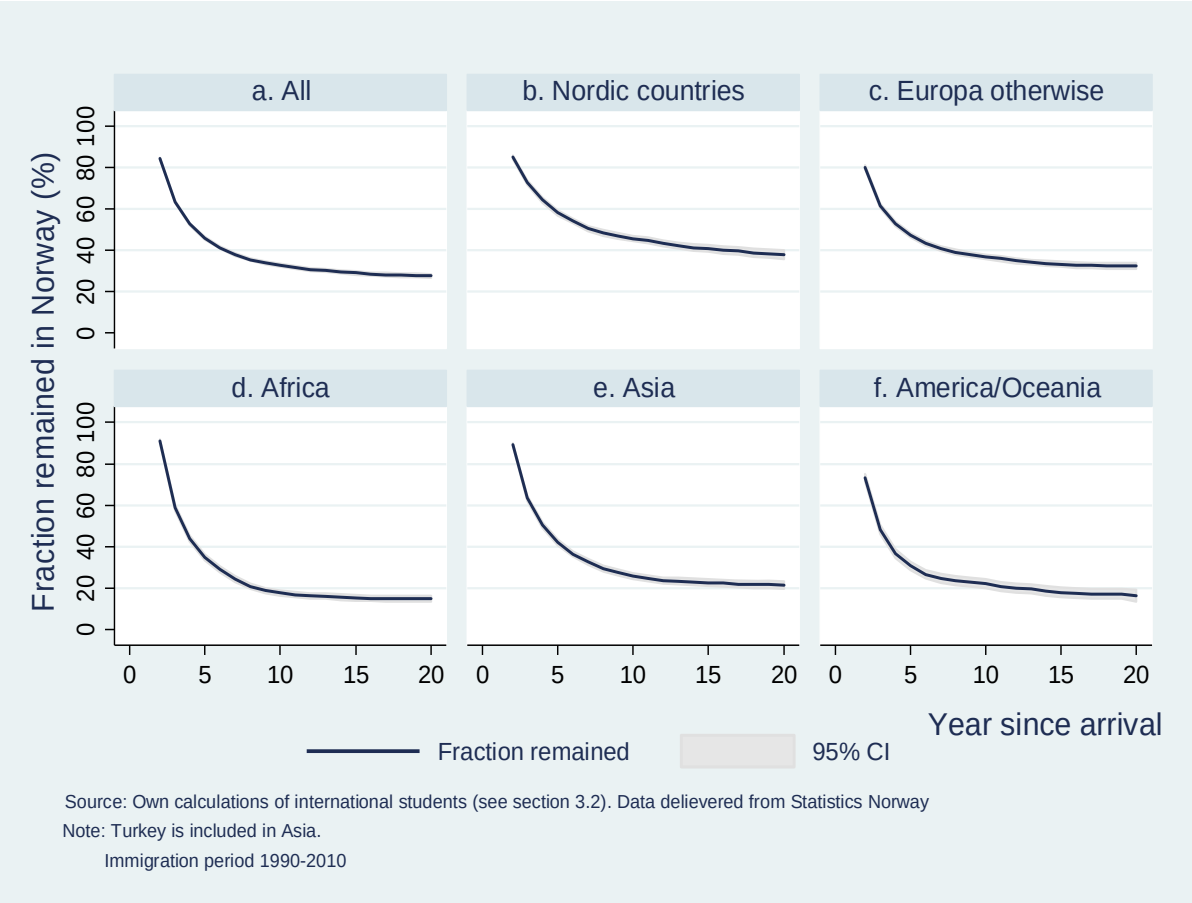
4.2 Time of out-migration

As a general rule, every immigrant who plans to live in Norway longer than 6 months must register their relocation to The National registry. The same rule applies if a student intends to stay abroad for at least 6 months. Students who receive a personal identification number can function as a Norwegian citizen (for example obtain tax card to work part time), which

gives students a strong incentives to register. However, some may not register out-migration. This can create an upward bias in the length of their stay. In my study, I do not capture those who re-migrate to Norway after their first time of out-migration.

Resident rules are different depending on where the students are from. This chapter will cover the time of out-migration[15] after region of origin.

Figure 4.6 Fraction of International Students remaining in Norway, by region of Origin.



Source: Own calculations of international students (see section 3.2). Data delievered from Statistics Norway
Note: Turkey is included in Asia.
Immigration period 1990-2010

Figure 4.4 provides a description on the fraction of remaining international students in Norway without filing out-migration, by resident time defined as year since immigration, and divided between regions of origin. Resident time equals 0 means at the end of the calendar year the students came, and resident time equals to 1 means at the end of the calendar year one year after the student came to Norway. Even though the observation period ended in

[15] For practical reasons, the calculation of fraction of remained international students are calculated from year of entry, and not after their graduation.

2010, students with residence at the end of the period are included. This means that they are right-censored (Cleves et.al 2010). For instance, we do not know whether a student who came in 2008, who has yet not filed out-migration in 2010 will continue to live in Norway in 2011, we only know that this student lived in Norway for 2 years. Therefore, they only contribute to the statistics by living here in 2 years.

Panel a. in figure 4.4 shows that slightly above 40 percent of the international students remained residents after 5 years, around 30 percent remained after 10 years and only about 25 percent were still living in Norway after 20 years. This result indicates that most students leave Norway.

As the figures shows, out-migration patterns differ by region of origin, this is correlated with different rules for obtaining resident permission. Slightly fewer than 40 percent were still resident after 20 years since arrival among students from the Nordic countries, which can partly be explained of the common Nordic labor market. After 5 year since arrival, about half of the students from Europe were still living in Norway, and after 20 years slightly above 30 percent were still resident in Norway.

Most students from Africa and America/Oceania leave Norway. After 5 years since arrival, about 30 percent of students from Africa and America/Oceania were still resident in Norway, and after 10 years below 20 percent of the students were still living in Norway. Students from Asia shows a different pattern, where about 40 percent were still living in Norway after 5 years since arrival, around 25 percent were still resident in Norway after 10 years, and about 20 percent of the students were still living here after 20 years.

5 Theoretical framework

This chapter will cover the theoretical framework behind a student migration decision, whether they stay or leave Norway. The theory behind their decision involves a comparison of region-specific levels in the country of origin and destination country.

5.1 Migration decision

Migration is a human capital investment (Borjas, 2013), in terms of the individual compares the present value of lifetime earnings in source and home country. Net gain to migration is given by:

$$Net\ gain\ to\ migration = PV^{Norway} - PV^{Source} - M$$

Where PV stands for present value, and M for migration costs. Therefore, migration occurs when there is a higher probability to retrieve the investment. Region-specific variables such as income differential between country of origin and host country and migration costs stimulates migration, and demographic characteristics such as age and education affects the migration decision.

5.1.1 The Roy model

The Roy model describes the issue with self-selection, where depending on the economic situation in the sending country and host country, the relative payoff for skills across countries determines the skill composition of the immigrant flow (Borjas, 2013). We are in a situation where international students in Norway are migrants with higher education, and they decide whether to stay in Norway by comparing the present value of lifetime earnings between their home country and Norway.

The latest estimates and patterns of returns to investment in education by Psacharopoulos and Patrinos (2004) find that the highest returns to education[16] are recorded for

[16] Return to education is defined as what an individual will earn more by obtaining an additional year of education (Borjas 2013)

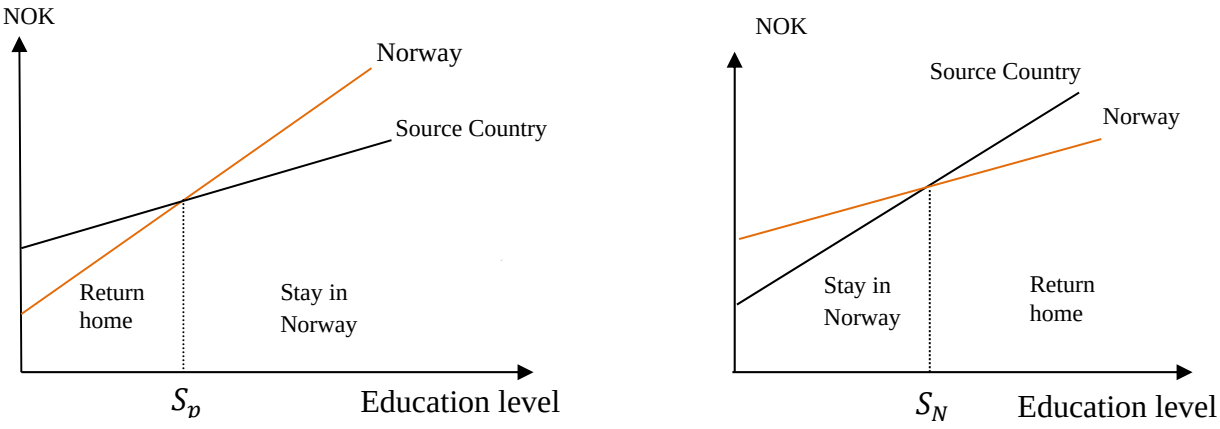
low-income and middle-income countries, and returns to education are recorded lower in the high-income OECD countries. This means that returns to education is lower in Norway compared to low- and middle income countries.

I assume that international students in Norway are above-average educated than the population in their source country. Therefore, it is reasonable to believe that students who receive higher payoff for their education in their home country will return home.

As long as returns for education in Norway is lower than the source countries, international students with education level that exceeds a certain threshold, will have a higher probability to return home. On the opposite case, when the returns to education in Norway are relatively higher than the source countries, students from countries with low returns to education will have a higher propensity to remain in Norway.

Figure 5.1 describes self-selection of who will remain in Norway. Figure 5.1 a.) illustrates that if the return to education is higher in Norway than in the source countries, students with a educational level higher than S_p will profitable to stay in Norway. Figure 5.1 b.) describes the opposite case, in this situation the returns to education is relative lower in Norway, students with a education level higher than S_N will likely return home.

Figure 5.1 Self-selection of who will remain in Norway



a.) Low return to education countries b.) High return to education countries

Source: *Labor Economics*. Borjas, George 2013, p. 340

Note: The model assumes that wage depend only on education level, no restriction on migration policy and no statistical discrimination.

6 Empirical strategy

As the Roy model explains the migration flow, international students in Norway are high-skilled migrants who decides to stay or leave Norway. This section investigates the empirical relationship between the probability of an international student remaining in Norway and the basic economic and demographic characteristics. With pooled cross sectional data, I can estimate the effect of region-specific variables and demographic characteristics on the propensity to remain in Norway.

6.1 Linear probability model

The question to be asked is whether a student remains in Norway or not; therefore, the dependent variable is discrete, and in this setting the dependent variable is a binary variable that take the value 1 if the student remains in Norway, and 0 otherwise (0 otherwise means that the student either return to their country of origin, or move to a third country). Since the binary dependent variable is regressed on the observable explanatory variables, we would expect that the predicted values of the dependent variable to fall between the interval 0 and 1. This means that the predicted values of the dependent variable can be interpreted as the probability that a student will remain in Norway given the values for the explanatory variables for that student.

When a dependent variable is dichotomous, the linear probability model is used as a method to investigate the probability that the student choose to remain in Norway as a function of basic region-specific variables and demographic characteristics.

6.1.1 Dependent variables

To construct the dependent variable, an essential problem occurs. Because of the problem with right-censored data (cf. chapter 4.3), we do not know if an arbitrary student who immigrated in 2009 will decide to stay, return, or move to a third country in the future. To estimate the effect of region-specific variables and demographic characteristics on whether a student will remain in Norway, two dependent variables are therefore used in the estimation process.

The first dependent variable is $Y_i^5 = 1$ if student *i* lives in Norway for at least 5 years, and 0 otherwise. The second dependent variable is $Y_i^{10} = 1$ if student *i* lives in Norway for at least 10 years, and 0 otherwise. These two dependent variables are chosen because 5 years may be a short time span to give an indication of whether a student will remain in Norway, and while 10 years provides a better indication, unfortunately we lack information because of right-censored data.

6.1.2 Independent variables

This subsection will deal with region-specific variables and demographic characteristics that affect the staying decision of an international student.

Previous studies have shown that economic theory holds that migration decision involves a comparison of region-specific variables and migration costs (Borjas, 1987; Borjas and Bratsberg, 1996; Bratsberg, Raum and Sørlie, 2007). High wage levels in the source country and migration costs discourage immigration. To measure wage levels, it is normal to use the natural logarithm of GDP per capita in the respective source countries as a proxy, and distance between the two countries as a proxy for migration costs (Schwartz, 1973). Existing literature confirms that the propensity to remain decreases with the higher level of GDP per capita in the source country, and the larger distance between host and source country (Borjas, 1987, Bratsberg 1995).

Bratsberg (1995) and Ibarran and Lubotsky (2007) confirms that high educated migrants tend to return or stay in countries where they receive higher returns for their education. Because Norway has relatively low returns to education compared to other countries, I expect that the higher educational level attained by a student, the lower probability is he/she will remain in Norway.

To capture region specific variables, I include the natural logarithm of GDP per capita, and distance from Norway, its second order polynomial to capture non-linear effects, and return to education in my regression models

Region-specific variables (income in origin/host country) are not the only factors determining a migration decision. Demographic characters such as age and education are

important factors. Migration occurs mostly among young and educated individuals. Because migration is a human capital investment, young people are more likely to migrate because they have a longer life span to retrieve their investment. In addition, the higher the educational attainment the higher probability is to migrate because education increases the individual capability of learning about employment opportunities in alternative labor markets (Borjas, 2013). Jensen and Pedersen (2007) confirm that young immigrants have higher probability to return or move to a third country, and the propensity to return increases with higher educational attainment (this study looks at the probability for an immigrant to leave Denmark, I would then expect opposite results for my case).

To measure the effects of demographic characteristics on the students staying decision, a set of control variables for age and education are included in the estimation model. I capture age effects by including age at immigration, and year of immigration and their second order polynomial. I include indicator variables for different levels of education, categorized in 5 groups, from high school enrollment to doctoral degree. And finally the last educational variable is whether the student has completed their highest education, which is defined as a dummy variable equal to 1 if the student has completed their highest educational degree, and zero otherwise. From the theory, I would then expect that the young students are more likely to stay, and the higher educational level, the lower propensity to stay.

Three other demographic variables I also control for in the estimation models are gender, continent of origin (defined as an indicator for the continents, Europe, Africa, Asia, Americas and Oceania), and marital status. The variable Female is defined as a dummy variable equal 1 if the student is a female, and 0 if the student is a male.

The variables marital status are mainly for capturing effect of whether the student was married[17] before the student came to Norway and whether the student changed their marital status to married partner during their stay. However, because of the endogeneity problem, where marrying during their stay in Norway affects their staying decision, there might be the case where staying in Norway for at least 5 or 10 years affects the chance of getting married. To solve the endogeneity problem, a group dummy variables are included in the model and are defined as following:

[17] The term married also include registered partner.

The variable "married before entered Norway" is defined as a dummy variable equal to 1 if the student was married before immigrating to Norway, and 0 otherwise. "Married during their stay" is defined as a dummy variable equal to 1 if the student changed their marital status to married within 0-5/0-10 years after they immigrated to Norway, and 0 otherwise. If the student got married between 0-5/0-10 years after they immigrated to Norway this might affect their decision to live in Norway for at least 5/10 years, but given that a student has lived in Norway for at least 5/10 years, this cannot affect whether the student decides to get married within 5/10 years after entered Norway. Therefore the endogeneity problem is solved. Two last variables are whether the student was married with a Norwegian citizen before coming to Norway, defined as a dummy variable equal to 1 if the student was married with a Norwegian citizen before entering Norway, and 0 otherwise. And whether they married a Norwegian citizen during their stay, defined as a dummy variable that takes the value of 1 if the student married a Norwegian citizen during their stay, and zero otherwise.

Because of family ties, I expect that students who were married before they came have lower propensity to stay. The study of out-migration in Denmark by Jensen and Pedersen (2007) showed that an immigrant married to a Danish citizen had a lower probability to out-migrate. Therefore, I expect that those who were married to a Norwegian citizen before they came, or during their stay will have a higher probability to remain in Norway.

The last variable that I choose to include in my model is the effect of a policy change. To measure the effect of the amend of the Quarantine Provision in 2001 had an effect on a student staying decision, I define the variable as a dummy variable that take the value 1 if the student migrated after 2000, and zero otherwise (meaning that the student migrated before year 2000). I expect that the students had a higher propensity to stay in Norway after the policy change.

6.2 Econometric model

For the estimation, I narrow my sample to international students between ages of 18 to 45, because these students are mostly the age group of interest. It would be more precise to investigate a student staying decision after graduation, but for practical reasons I do not take it into consideration in my study.

Together 4 models are estimated, with two different dependent variable. The two dependent variables will be estimated with full sample and limited sample which include returns to education (data on returns education only includes for 84 countries).

(6.1) $Pr(Y_i^t = 1|X_1, X_2, \ldots\ldots, X_k)$

$$= \boldsymbol{\beta_0} + \boldsymbol{\beta_1} ln\_GDP\_percapita_i + \boldsymbol{\beta_2} Distance_i + \boldsymbol{\beta_3 X}_i + \boldsymbol{\varepsilon_i}$$

(6.2) $Pr(Y_i^t = 1|X_1, X_2, \ldots\ldots, X_k)$

$$= \boldsymbol{\beta_0} + \boldsymbol{\beta_1} ln\_GDP\_percapita_i + \boldsymbol{\beta_2} Distance_i + \boldsymbol{\beta_3} Educ\_Return_i$$

$$+ \boldsymbol{\beta}_4 \boldsymbol{X}_1 + \boldsymbol{\varepsilon_i}$$

Where the variable Y_i^t represent the dependent variable which takes the value Y = 1 if the student *i* lives in Norway for t years, where t equal 5 or 10 years.

The regressors of interest, *ln_GDP_percapita* indicate how wealthy the country of origin to individual *i*, the variable Distance captures migration costs, while $\boldsymbol{X}$ is a vector of control variables which control for demographic characteristics outlined in chapter 6.1.3 and $\boldsymbol{\varepsilon_i}$ is a vector of stochastic disturbance. The regression model (6.2) included the variable returns to education, *Educ_Return* in country *i.*

In words, the models (6.1) and (6.2) for the case of 5 years, can be interpreted as the conditional probability that a student will live in Norway for at least 5 years for the given value of the explanatory variables.

6.2.1 Assumptions of the Classical Linear Regression Model

The models outlined in section 6.2 included a disturbance term, and therefore the models are stochastic (Kennedy, 2003), which explain the empirical relationship between the probability to stay in Norway and economic and demographic characteristics. The interpretation of the disturbance term is that it captures all other factors which determine the predicted dependent value (remain in Norway) that the model does not explain. Therefore, for the model to be precise as possible, in the sense that ordinary least squares provides a proper estimator for the coefficients, $\boldsymbol{\beta}$'s, assumptions on the linear regression model and requirements of the stochastic properties should be satisfied. In addition, because the LPM is the linear multiple regression model, the classical assumptions for multiple regression also apply for LPM (Stock and Watson, 2011).

The assumptions for classical linear regression (Stock and Watson, 2011):

1. $E(\varepsilon_i|X_{1i}, X_{2i}, \ldots . X_{ki}) = 0$, the conditional expectation of the disturbance term given the explanatory variables are equal zero.
2. $\left(X_{1i}, X_{2i,} X_{3i}, \ldots . X_{ki}, Y_i\right) \sim i.i.d.$ where *i* = 1,....,n, are identically independent distributed across observations
3. Large outliers are unlikely.
4. No perfect multicollinearity.

Together with assumption 1. the stochastic properties for the disturbance term (Bjørn, 2009):

5. $E(\varepsilon_i, \varepsilon_j) = \begin{cases} \sigma^2 & for\ j = i \\ 0 & for\ j \neq i \end{cases}$ the disturbance terms all have the same variance and are not correlated with one another.

When operating with LPM, the disturbances are always hetereoskedastic (Stock and Watson, 2011), therefore the assumption 5. is violated, i.e. the disturbance terms do not have the same variance. However, the $\boldsymbol{\beta}$'s continues to be consistent and unbiased. For the dataset used in my study, it is reasonable to believe that students from the same country share certain characteristic which creates covariation between each other, this might lead to

correlation between the disturbances. This problem is called clustering of the disturbance term. I solve this problem by clustering the countries.

It is also important that none of the independent variables are perfect multicollinear, in terms of that one of the regressors is a perfect linear function of the other regressor, i.e. the explanatory variables cannot have a correlation of -1 or 1. However, there is a possibility that the independent variables can be imperfect multicollinear, in the meaning that they may be highly correlated, but not perfect. It might be possible that GDP per capita and returns to education are correlated. This does not prevent estimation, but the consequences is that if GDP per capita and returns to education are highly correlated, the coefficients could be estimated imprecisely due to when the dependent variables is regressed on GDP per capita and returns to education together, little information is used to estimate the respective coefficients. As a result, this will cause the variances of these estimates to be large. Therefore, we do not know how the explanatory variables affect the staying decision individually.

It is possible that when $\mathrm{E}(\varepsilon_i|\mathrm{X}_{1i}, \mathrm{X}_{2i}, \ldots\ldots \mathrm{X}_{ki}) \neq 0$, in this situation there might be omitted variable biased in the model, which means that there can be one or two variable that are correlated with the already included independent variables, and that the variable(s) are also a determinant of the dependent variable. For example has the study of Jensen and Pedersen (2007) included the variable number of children.

While the coefficients in a LMP are quite straightforward to interpret, it is possible to get predicted probabilities outside of the range 0-1, which makes no sense because probabilities cannot exceed 1 or drop below 0 (Stock and Watson, 2011). Therefore there might be preferable to use Probit regression[18] (non-linear regression which forces the predicted values to fall between 0 and 1 by using standard normal cumulative density function), however experience has shown that non-linear specifications rarely improves the regressors (Kennedy, 2003).

[18] Probit regression and their marginal effects are shownin Appendix.

7 Results

Based on the stock of international students from 1990 to 2010, I performed four linear probability models which analyze a student decision whether to stay in Norway. As described in chapter 6, I estimate the probability of an international student to remain in Norway given basic economic variables in their home countries and control for demographic characteristics.

The estimation results are reported in table 3, where column (1) and (2) show estimation results for the full sample with dependent variable 5 and 10 years respectively, and collumn (3) and (4) shows estimation results for the limited sample, with the dependent variable 5 and 10 years respectively.

Table 3. Regression results: Determinants of a student staying decision

	Full sample		Limited sample	
	(1)	(2)	(3)	(4)
	5 Years	10 Years	5 Years	10 Years
Independent variable				
ln GDP per capita	-0.0334***	-0.0155**	-0.0331***	-0.0118
	(0.00538)	(0.00512)	(0.00719)	(0.00645)
Distance	-0.109***	-0.0733***	-0.144***	-0.0911***
	(0.0163)	(0.0142)	(0.0180)	(0.0164)
Distance squared	0.00640***	0.00447***	0.00871***	0.00580***
	(0.00107)	(0.000958)	(0.00116)	(0.00109)
Year at entry - 1990	-0.0644***	-0.0389***	-0.0644***	-0.0298**
	(0.00692)	(0.00896)	(0.00789)	(0.00969)
Year at entry – 1990 squared	0.00313***	0.00257***	0.00316***	0.00190*
	(0.000395)	(0.000697)	(0.000456)	(0.000761)
Age at entry	0.0434***	0.0359***	0.0385***	0.0329***
	(0.00602)	(0.00633)	(0.00688)	(0.00720)

(Table continues on the following page.)

Table 3 (continued)

Age at entry squared	-0.000701***	-0.000540***	-0.000616***	-0.000483***
	(0.000101)	(0.000106)	(0.000115)	(0.000120)
Female	0.0349***	0.0408***	0.0309***	0.0388***
	(0.00750)	(0.00776)	(0.00809)	(0.00824)
Continents				
Europe (Omitted)	-	-	-	-
Africa	0.0667	0.0205	0.138*	0.0522
	(0.0426)	(0.0396)	(0.0535)	(0.0490)
Asia	0.147***	0.0701	0.249***	0.122*
	(0.0418)	(0.0394)	(0.0521)	(0.0487)
Americas	0.139**	0.0893*	0.219***	0.116*
	(0.0442)	(0.0417)	(0.0521)	(0.0494)
Oceania	-0.329***	-0.248**	-0.422***	-0.352***
	(0.0802)	(0.0866)	(0.0860)	(0.0958)
Marital status				
Married before arrival	-0.353***	-0.311***	-0.351***	-0.306***
	(0.0169)	(0.0178)	(0.0197)	(0.0200)
Married before arrival w/ Norwegian citizen	0.344***	0.313***	0.320***	0.282***
	(0.0295)	(0.0392)	(0.0328)	(0.0428)
Married during stay	0.332***	0.311***	0.334***	0.310***
	(0.0141)	(0.0167)	(0.0169)	(0.0189)
Married during stay w/ Norwegian citizen	0.0946***	0.0195***	0.103***	0.204***
	(0.0162)	(0.0184)	(0.0191)	(0.0206)

(Table continues on the following page.)

Table 3. (continued)

Education level				
Secondary level (omitted)	-	-	-	-
End of secondary level	0.0744**	-0.00517	0.0825**	-0.00293
	(0.0231)	(0.0238)	(0.0268)	(0.0271)
Bachelor level	-0.0349*	-0.0561***	-0.0352*	-0.0624***
	(0.0141)	(0.0152)	(0.0159)	(0.0168)
Master level	-0.145***	-0.124***	-0.131***	-0.118***
	(0.0148)	(0.0169)	(0.0168)	(0.0190)
Ph.D level	0.0324	0.00383	0.0467	0.000734
	(0.0234)	(0.0272)	(0.0258)	(0.0301)
Completed education	0.00285	0.0275	0.0000715	0.0216
	(0.0166)	(0.0157)	(0.0189)	(0.0174)
Returns to education			0.00202	0.000820
			(0.00108)	(0.000877)
Reform 2001	0.0440	0.0127	0.0332	0.0165
	(0.0250)	(0.0272)	(0.0290)	(0.0314)
Intercept	0.495***	0.0407	0.559***	0.0284
	(0.110)	(0.105)	(0.136)	(0.129)
R-squared	0.188	0.253	0.191	0.255
Observations	20645	12436	16786	10126
Sample mean dependent variable	0.44	0.324	0.435	0.32
Clustered	Yes	Yes	Yes	Yes

Source: Own calculation using the statistical program STATA.
Standard errors in parentheses
* Significance at 10 % level, ** Significance at 5 % level, *** Significance at 1 % level.

The theory predicts that the better economic conditions in the home country, the less likely a student will remain in Norway. The variables ln GDP per capita and distance are never zero, and therefore the intercept cannot be interpreted as usual. As expected, the results show that the coefficients ln GDP per capita and distance are statistical significantly negative (except for model (4) where ln GDP per capita has a negative sign, but not statistically significant). The the wealthier home countries will induce students to leave Norway, and the greater the distance (higher migration costs) between the home country and Norway, the less likely a student will remain in Norway. The finding that the greater the distance between the home country and Norway induce students to leave Norway, however I also included a distance squared to examine the possibility that the effect of distance on the staying decision is non-linear. The results in table 3 indicate that the deterrent effect of distance on the probability to stay in Norway decreases as distance increases. That is, as distance between country of origin and Norway increases, the probability to stay in Norway decreases, but at a diminishing rate. These results are consistent with the study conducted by Bratsberg (1995).

The effect of year at entry is significantly negative for all the estimation models. The variable included a quadratic term, where I find a significant non-linearity with an increasing probability to remain. These findings suggest that with increased student mobility to Norway after the 21th century several students remained. The coefficient age at entry is significantly positive for all models. That is, the higher age at entry the more likely the student will remain. The variable also included a quadratic specification, where I find a significant non-linearity with a decreasing propensity to stay. This result is consistent with the theory, indicating after a certain age, the less likely the student will decide to stay in Norway because he/she has a shorter life time to retrieve the investment on migration.

The dummy variable Gender indicates that female students are more likely to remain compared to male students. They have on average from 3.09 percentage points to 4.08 percentage points higher probability to remain in Norway.

Controlling for continent of origin (Europe as a base group), the results show no statistical evidence for students from Africa of whether they will remain in Norway, exception is for

model (3) in the limited sample where they on average have 13.8 percentage points than European students to remain in Norway for at least 5 years.

Unlike to Africa, I found statistical evidence for a higher propensity to stay for all the regression models for students from Asia and America. Lastly, the results show statistical evidence for students from Oceania have a high probability to return home. This result is not surprising as according to the theory, the distance between Norway and Oceania is very large, inducing students to leave due to high migration costs.

The variables for capturing the effects from marital status shows, not surprisingly, students who were married before arrival significantly decreases the probability to stay, this result indicates that family ties in the home country is an important matter in migration decision. As expected, students who are married to a Norwegian citizen significantly increase the probability to remain. These results are also confirmed by the study of Pedersen and Jensen (2007).

As predicted by theory, the group of educational variables shows a pattern of students with higher education level tends to return home. The results in table 3 indicate that students at secondary level have significantly higher probability to remain in Norway for 5 years, both in the full and limited sample. The propensity to stay significantly decreases with education level at bachelor- and master level, which suggest that this is consistent with theory that students with higher education return home to countries where they recieve higher returns for their education, and less-qualified student stays in countries where there is low returns to education. However, I do not find any stasticial evidence for students at doctoral level has an effect on a student staying decision.

Lastly, the regressions fail to find statistical evidence that the policy reform in 2001 had an effect on students staying decisions. This result is line with the previous study by Brekke (2006).

8 Conclusion

This thesis used pooled cross sectional data to study international student migration to Norway over the period 1990 to 2010. During that period, over 37 000 international students from 180 different countries came to Norway to study. Slightly half of the student mass has background from Europe, but there is a large growing group of students from non-EU/EEA.

Of the international students who came to Norway, only 25 percent still lived in Norway after 20 years since they arrived. Students from the Nordic countries and EU/EEA tend to stay for a longer period. 10 years after arrival, over 40 percent of students from the Nordic countries were still living in Norway, and just below 40 percent of students from EU/EEA were still residents in Norway. On the contrary, over half students from non-EU/EEA leave within 5 years since arrival. This variation in pattern can partly be explained by different rules for receiving residence permit.

Using micro datasets, I investigated the probability for an international student to remain in Norway. I find a number of important determinants that influence a student's decision to stay. First, I find the propensity to stay varies significantly across sending countries, but the variation could be explained by differences in economic conditions in the source countries. My results show that students return home to wealthy countries and when the distance between the home country and Norway is large. In particular, they tend to return to countries where they receive higher returns on their investment in education. Second, I find indirect evidence of skill sorting, as predicted by the Roy model. As return to education is relatively low in Norway, students with high education level tend to return home. In addition, I find that marital status has a strong impact on a student decision to stay. And the policy reform in 2001 did not seem to have an effect.

The discussion concerning international students is still controversial. Despite positive educational benefits - and eased labor policy towards international students, there is still disagreements' regarding the interest around the increased international student migration to Norway. Those who remained have high labor force participation and a large fraction works in occupations that require higher education (Tronstad and Andreassen, 2013). To

clarify the ambivalence to the Norwegian authorities, further research about international student migration and their potential participation in the labor force is encouraged.

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Appendix

Table 4. Descriptive statistics for dependent (In Norway for 5 years) and independent variables. Full sample

```
Estimation sample regress
                                Number of obs        =    20645

                                Number of clusters   =     1501
                                Obs per cluster: min =        1
                                                 avg =     13.8
                                                 max =      423

  ------------------------------------------------------------------
      Variable |        Mean     Std. Dev.       Min        Max
  -------------+----------------------------------------------------
         inor5 |    .4396706      .496359          0          1
      lngdp_pc |    8.470394     1.748202    4.74352    10.8607
          dist |    3.617607     3.372006       .415     17.658
         dist2 |    24.45695     36.69244    .172225    311.805
         trend |    11.43594     4.406901          1         17
        trend2 |    150.2006     90.07871          1        289
        reform |    .5572294      .496726          0          1
         ageim |    25.82228     5.143075         18         45
        ageim2 |    693.2402     295.5074        324       2025
               |
          cont |
             2 |    .1570356     .3638431          0          1
             3 |     .189489      .391906          0          1
             4 |    .0586098     .2348987          0          1
             5 |    .0076532     .0871492          0          1
               |
        gender |    .5495762     .4975482          0          1
               |
           utd |
             5 |    .0790506     .2698243          0          1
             6 |    .4098813     .4918235          0          1
             7 |    .3658029     .4816662          0          1
             8 |    .0434972     .2039785          0          1
               |
      fullfort |    .9379026     .2413381          0          1
         gift0 |    .1722935     .3776445          0          1
       gift0_5 |    .3379511     .4730232          0          1
   gift_nor0_5 |    .1141196     .3179642          0          1
     gift_nor0 |    .0152095     .1223883          0          1
  ------------------------------------------------------------------
```

Table 5. Descriptive statistics for dependent (In Norway for 10 years) and independent variables. Full sample:

Estimation sample regress

Number of obs = 12436

Number of clusters = 1093
Obs per cluster: min = 1
avg = 11.4
max = 224

Variable	Mean	Std. Dev.	Min	Max
inor10	.3241396	.4680713	0	1
lngdp_pc	8.447897	1.802542	4.74352	10.8586
dist	3.503227	3.332059	.415	17.658
dist2	23.37433	36.88046	.172225	311.805
trend	8.696848	3.542324	1	13
trend2	88.18221	54.79551	1	169
reform	.2649566	.4413278	0	1
ageim	25.82711	5.357267	18	45
ageim2	695.7379	307.6559	324	2025
cont				
2	.1672564	.3732196	0	1
3	.1649244	.3711272	0	1
4	.0591026	.2358261	0	1
5	.0086845	.0927887	0	1
gender	.5293503	.4991579	0	1
utd				
5	.1235928	.3291297	0	1
6	.3977163	.4894459	0	1
7	.3205211	.4666956	0	1
8	.0447893	.2068494	0	1
fullfort	.9205532	.2704457	0	1
gift0	.1885655	.3911788	0	1
gift_nor0	.0162432	.1264144	0	1
gift0_10	.4515922	.4976712	0	1
gift_nor0_10	.1776295	.3822159	0	1

Table 6. Descriptive statistics for dependent (In Norway for 5 years) and independent variable. Limited sample:

```
Estimation sample regress
                                Number of obs        =    16786

                                Number of clusters   =      979
                                Obs per cluster: min =        1
                                                 avg =     17.1
                                                 max =      423
```

Variable	Mean	Std. Dev.	Min	Max
inor5	.4346479	.4957255	0	1
lngdp_pc	8.618195	1.787861	4.74352	10.6174
dist	3.757874	3.519401	.415	17.658
dist2	26.50706	38.74679	.172225	311.805
trend	11.43113	4.431069	1	17
trend2	150.304	90.66819	1	289
reform	.5536757	.4971254	0	1
ageim	25.87347	5.139005	18	45
ageim2	695.844	295.3399	324	2025
cont				
2	.1520315	.3590621	0	1
3	.2086858	.4063814	0	1
4	.0699392	.2550522	0	1
5	.0092935	.0959564	0	1
gender	.5316931	.4990094	0	1
utd				
5	.0831645	.276139	0	1
6	.4123674	.4922753	0	1
7	.3558918	.4787969	0	1
8	.0467652	.2111417	0	1
fullfort	.937567	.2419475	0	1
gift0	.1704992	.376082	0	1
gift_nor0	.0164423	.1271727	0	1
gift0_5	.3286667	.4697425	0	1
gift_nor0_5	.11313	.3167611	0	1
educ	15.73822	7.427351	3	56

Table 7. Descriptive statistics for dependent (In Norway for 10 years) and independent variables. Limited sample:

```
Estimation sample regress
                              Number of obs        =    10126

                              Number of clusters   =      725
                              Obs per cluster: min =        1
                                               avg =     14.0
                                               max =      224

  ------------------------------------------------------------
      Variable |        Mean     Std. Dev.       Min        Max
  -------------+----------------------------------------------
        inor10 |    .3197709     .4664107          0          1
      lngdp_pc |    8.568287     1.845509    4.74352    10.6174
          dist |    3.620677     3.467968       .415     17.658
         dist2 |    25.13492     38.91787    .172225    311.805
         trend |    8.673514      3.54438          1         13
        trend2 |    87.79123     54.65125          1        169
        reform |    .2601225     .4387229          0          1
         ageim |     25.8649     5.337269         18         45
        ageim2 |    697.4768     306.4804        324       2025
               |
          cont |
             2 |    .1646257     .3708607          0          1
             3 |     .178649     .3830771          0          1
             4 |    .0710053     .2568464          0          1
             5 |    .0104681     .1017818          0          1
               |
        gender |    .5148134     .4998052          0          1
               |
           utd |
             5 |    .1296662     .3359524          0          1
             6 |    .3969978     .4892997          0          1
             7 |    .3105866     .4627566          0          1
             8 |    .0475015     .2127194          0          1
               |
      fullfort |    .9192179     .2725137          0          1
         gift0 |    .1846731     .3880513          0          1
    gift_nor0 |     .017776      .132143          0          1
     gift0_10 |    .4440055     .4968793          0          1
  gift_nor0_10 |    .1794391     .3837385          0          1
          educ |    15.88827      7.50454          3         56
  ------------------------------------------------------------
```

Table 8. Regression results using probit regression. Dependent variable In Norway for 5 years. Full sample:

```
Probit regression                                 Number of obs   =      20645
                                                  Wald chi2(22)   =    2174.99
                                                  Prob > chi2     =     0.0000
Log pseudolikelihood = -11988.342                 Pseudo R2       =     0.1533

                           (Std. Err. adjusted for 1501 clusters in cluster)
------------------------------------------------------------------------------
             |               Robust
       inor5 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    lngdp_pc |  -.1010301    .016712    -6.05   0.000     -.133785   -.0682751
        dist |   -.320957   .0473139    -6.78   0.000    -.4136907   -.2282234
       dist2 |   .0186336   .0031326     5.95   0.000     .0124939    .0247734
       trend |  -.1915932   .0204727    -9.36   0.000    -.2317189   -.1514675
      trend2 |   .0092813   .0011393     8.15   0.000     .0070483    .0115143
      reform |   .1376015   .0744754     1.85   0.065    -.0083676    .2835705
       ageim |   .1322824   .0187275     7.06   0.000     .0955772    .1689876
      ageim2 |  -.0021538    .000319    -6.75   0.000    -.0027791   -.0015285
             |
        cont |
          2  |   .1863654   .1251992     1.49   0.137    -.0590205    .4317513
          3  |   .4405948   .1224736     3.60   0.000     .2005509    .6806387
          4  |   .4028214   .1340416     3.01   0.003     .1401047     .665538
          5  |  -1.090754   .2837665    -3.84   0.000    -1.646926    -.534582
             |
      gender |    .098754   .0223983     4.41   0.000     .0548542    .1426539
             |
         utd |
          5  |   .2301138   .0673868     3.41   0.001     .0980381    .3621896
          6  |  -.0935107   .0412578    -2.27   0.023    -.1743745    -.012647
          7  |  -.4208786   .0454281    -9.26   0.000    -.5099161   -.3318411
          8  |   .1045884   .0670994     1.56   0.119     -.026924    .2361009
             |
    fullfort |   .0057443   .0520231     0.11   0.912    -.0962191    .1077077
       gift0 |   -.991833   .0510114   -19.44   0.000    -1.091813   -.8918525
     gift0_5 |   .9245373   .0429605    21.52   0.000     .8403362    1.008738
 gift_nor0_5 |   .3479482   .0570959     6.09   0.000     .2360424    .4598541
  gift_nor0  |   .9802269   .1162586     8.43   0.000     .7523643     1.20809
       _cons |  -.0147379   .3337758    -0.04   0.965    -.6689264    .6394505
------------------------------------------------------------------------------
```

Table 9. Regression results using probit regression. Dependent variable In Norway for 10 years. Full sample:

```
Probit regression                                 Number of obs   =      12436
                                                  Wald chi2(22)   =    2148.31
                                                  Prob > chi2     =     0.0000
Log pseudolikelihood = -6214.8463                 Pseudo R2       =     0.2067

                           (Std. Err. adjusted for 1093 clusters in cluster)
------------------------------------------------------------------------------
             |               Robust
      inor10 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    lngdp_pc |  -.0562559   .0189002    -2.98   0.003    -.0932997   -.0192121
        dist |  -.2621144   .0485665    -5.40   0.000    -.3573029   -.1669259
       dist2 |   .0156543   .0033362     4.69   0.000     .0091155    .0221932
       trend |  -.1372031   .0301744    -4.55   0.000    -.1963438   -.0780625
      trend2 |   .0089341    .002387     3.74   0.000     .0042557    .0136125
      reform |   .0551321   .0946977     0.58   0.560    -.1304721    .2407363
       ageim |   .1282878   .0230488     5.57   0.000     .0831131    .1734626
      ageim2 |  -.0019662   .0003947    -4.98   0.000    -.0027398   -.0011926
             |
        cont |
          2  |   .0530894    .134046     0.40   0.692    -.2096359    .3158146
          3  |   .2632533   .1340945     1.96   0.050      .000433    .5260737
          4  |   .3328799   .1529984     2.18   0.030     .0330085    .6327514
          5  |  -.9021575   .3807539    -2.37   0.018    -1.648421   -.1558936
             |
      gender |   .1402341   .0273049     5.14   0.000     .0867175    .1937507
             |
         utd |
          5  |   .0082517   .0761325     0.11   0.914    -.1409653    .1574687
          6  |  -.1736183   .0487554    -3.56   0.000    -.2691772   -.0780595
          7  |   -.439572   .0584678    -7.52   0.000    -.5541667   -.3249773
          8  |   .0378418    .085281     0.44   0.657    -.1293059    .2049895
             |
    fullfort |   .1027386   .0608372     1.69   0.091    -.0165002    .2219774
       gift0 |  -.9106126   .0550428   -16.54   0.000    -1.018495   -.8027306
   gift_nor0 |   .9030887   .1294839     6.97   0.000     .6493049    1.156873
    gift0_10 |   .9130967   .0495891    18.41   0.000     .8159037     1.01029
gift_nor0_10 |   .5253168   .0519892    10.10   0.000     .4234198    .6272138
       _cons |  -1.444025   .3796536    -3.80   0.000    -2.188132   -.6999174
------------------------------------------------------------------------------
```

Table 10. Regression results using probit regression. Dependent variable In Norway for 5 years. Limited sample:

```
Probit regression                                 Number of obs   =      16786
                                                  Wald chi2(23)   =    1740.51
                                                  Prob > chi2     =     0.0000
Log pseudolikelihood = -9748.4967                 Pseudo R2       =     0.1517

                            (Std. Err. adjusted for 979 clusters in cluster)
------------------------------------------------------------------------------
             |               Robust
       inor5 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    lngdp_pc |  -.1021581   .0225525    -4.53   0.000    -.1463603   -.0579559
        dist |  -.4334533   .0526906    -8.23   0.000    -.5367251   -.3301816
       dist2 |   .0261473   .0033912     7.71   0.000     .0195006    .0327939
       trend |    -.19002   .0232842    -8.16   0.000    -.2356562   -.1443839
      trend2 |   .0092915   .0013127     7.08   0.000     .0067186    .0118644
      reform |   .1056936     .08622     1.23   0.220    -.0632945    .2746818
       ageim |   .1159063   .0211578     5.48   0.000     .0744379    .1573748
      ageim2 |  -.0018678   .0003587    -5.21   0.000    -.0025709   -.0011648
             |
        cont |
          2  |   .3996164   .1583179     2.52   0.012      .089319    .7099138
          3  |   .7556083   .1541854     4.90   0.000     .4534104    1.057806
          4  |   .6505334   .1587127     4.10   0.000     .3394623    .9616046
          5  |  -1.457941   .3060823    -4.76   0.000    -2.057852   -.8580308
             |
      gender |   .0884268   .0242737     3.64   0.000     .0408511    .1360025
             |
         utd |
          5  |   .2572178   .0785101     3.28   0.001     .1033409    .4110947
          6  |  -.0899898   .0464071    -1.94   0.052     -.180946    .0009663
          7  |  -.3750281   .0513738    -7.30   0.000    -.4757189   -.2743372
          8  |   .1515064   .0738758     2.05   0.040     .0067124    .2963004
             |
    fullfort |  -.0046587   .0588685    -0.08   0.937    -.1200389    .1107215
       gift0 |  -.9831182   .0588377   -16.71   0.000    -1.098438   -.8677983
   gift_nor0 |   .8986168   .1255833     7.16   0.000     .6524782    1.144756
     gift0_5 |   .9309966   .0512162    18.18   0.000     .8306146    1.031379
 gift_nor0_5 |   .3749486   .0661305     5.67   0.000     .2453352    .5045621
        educ |   .0069988   .0034256     2.04   0.041     .0002848    .0137128
       _cons |   .2031629   .4130724     0.49   0.623    -.6064441     1.01277
------------------------------------------------------------------------------
```

Table 11. Regression results using probit regression. Dependent variable In Norway for 10 years. Limited sample:

```
Probit regression                                 Number of obs   =      10126
                                                  Wald chi2(23)   =    1871.01
                                                  Prob > chi2     =     0.0000
Log pseudolikelihood = -5016.3378                 Pseudo R2       =     0.2095

                              (Std. Err. adjusted for 725 clusters in cluster)
------------------------------------------------------------------------------
             |               Robust
      inor10 |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    lngdp_pc |  -.0451021   .0249844    -1.81   0.071    -.0940706    .0038663
        dist |  -.3405739    .058405    -5.83   0.000    -.4550456   -.2261021
       dist2 |   .0215699   .0038817     5.56   0.000     .0139618    .0291779
       trend |  -.1058198   .0328042    -3.23   0.001    -.1701149   -.0415247
      trend2 |   .0066617   .0026223     2.54   0.011      .001522    .0118013
      reform |   .0673494   .1098795     0.61   0.540    -.1480106    .2827093
       ageim |   .1157669    .026032     4.45   0.000     .0647451    .1667887
      ageim2 |  -.0017265   .0004442    -3.89   0.000    -.0025972   -.0008559
             |
        cont |
          2  |   .1615866   .1714088     0.94   0.346    -.1743684    .4975415
          3  |   .4693166   .1723642     2.72   0.006      .131489    .8071442
          4  |   .4308484   .1868059     2.31   0.021     .0647156    .7969813
          5  |  -1.435857   .4273539    -3.36   0.001    -2.273455   -.5982589
             |
      gender |   .1364336   .0291367     4.68   0.000     .0793267    .1935404
             |
         utd |
          5  |   .0250359   .0877421     0.29   0.775    -.1469354    .1970071
          6  |  -.1905318     .05423    -3.51   0.000    -.2968207    -.084243
          7  |  -.4138646   .0662455    -6.25   0.000    -.5437035   -.2840258
          8  |   .0409804   .0949023     0.43   0.666    -.1450247    .2269856
             |
    fullfort |   .0795579   .0677081     1.18   0.240    -.0531476    .2122634
       gift0 |  -.9021511   .0622335   -14.50   0.000    -1.024126   -.7801756
   gift_nor0 |    .805317   .1378367     5.84   0.000     .5351621    1.075472
    gift0_10 |   .9239669   .0577427    16.00   0.000     .8107934     1.03714
gift_nor0_10 |   .5488802   .0586044     9.37   0.000     .4340178    .6637427
        educ |   .0049523   .0036554     1.35   0.175    -.0022123    .0121168
       _cons |  -1.461854   .4756898    -3.07   0.002    -2.394189   -.5295194
------------------------------------------------------------------------------
```

Table 12. Regression results using probit regression with marginal effects. Dependent variable In Norway for 5 years. Full sample:

```
Average marginal effects                          Number of obs   =      20645
Model VCE    : Robust

Expression   : Pr(inor5), predict()
dy/dx w.r.t. : lngdp_pc dist dist2 trend trend2 reform ageim ageim2 2.cont 3.cont
4.cont 5.cont
               gender 5.utd 6.utd 7.utd 8.utd fullfort gift0 gift0_5 gift_nor0_5
gift_nor0

------------------------------------------------------------------------------
             |            Delta-method
             |      dy/dx   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    lngdp_pc |  -.0333584   .0054768    -6.09   0.000    -.0440927   -.0226242
        dist |  -.1059747   .0155292    -6.82   0.000    -.1364114   -.0755379
       dist2 |   .0061525   .0010303     5.97   0.000     .0041332    .0081718
       trend |  -.0632609   .0065864    -9.60   0.000    -.0761699   -.0503519
      trend2 |   .0030645    .000369     8.30   0.000     .0023412    .0037878
      reform |   .0454337   .0245742     1.85   0.064    -.0027309    .0935983
       ageim |   .0436775   .0061505     7.10   0.000     .0316226    .0557323
      ageim2 |  -.0007111   .0001048    -6.78   0.000    -.0009166   -.0005057
             |
        cont |
          2  |    .059324   .0390955     1.52   0.129    -.0173019    .1359498
          3  |     .14189    .036767     3.86   0.000     .0698281    .2139519
          4  |   .1296204   .0410441     3.16   0.002     .0491755    .2100653
          5  |  -.2697175    .048711    -5.54   0.000    -.3651892   -.1742458
             |
      gender |   .0326069   .0074001     4.41   0.000      .018103    .0471109
             |
         utd |
          5  |   .0794827   .0231626     3.43   0.001     .0340848    .1248807
          6  |  -.0322103   .0142077    -2.27   0.023    -.0600568   -.0043638
          7  |  -.1407715   .0152713    -9.22   0.000    -.1707027   -.1108402
          8  |   .0362026   .0232045     1.56   0.119    -.0092774    .0816827
             |
    fullfort |   .0018967   .0171768     0.11   0.912    -.0317693    .0355627
       gift0 |  -.3274867   .0162879   -20.11   0.000    -.3594105    -.295563
     gift0_5 |   .3052668   .0133556    22.86   0.000     .2790902    .3314434
 gift_nor0_5 |   .1148867   .0188107     6.11   0.000     .0780184     .151755
   gift_nor0 |   .3236546   .0379568     8.53   0.000     .2492607    .3980485
------------------------------------------------------------------------------
```

Table 13. Regression results using probit regression with marginal effects. Dependent variable In Norway for 10 years. Full sample:

```
Average marginal effects                          Number of obs   =      12436
Model VCE    : Robust

Expression   : Pr(inor10), predict()
dy/dx w.r.t. : lngdp_pc dist dist2 trend trend2 reform ageim ageim2 2.cont 3.cont
4.cont 5.cont
               gender 5.utd 6.utd 7.utd 8.utd fullfort gift0 gift_nor0 gift0_10
gift_nor0_10

------------------------------------------------------------------------------
             |            Delta-method
             |      dy/dx   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    lngdp_pc |   -.015751   .0052799    -2.98   0.003    -.0260994   -.0054025
        dist |  -.0733888   .0138492    -5.30   0.000    -.1005327   -.0462449
       dist2 |    .004383   .0009483     4.62   0.000     .0025244    .0062416
       trend |  -.0384152   .0084225    -4.56   0.000     -.054923   -.0219073
      trend2 |   .0025014   .0006674     3.75   0.000     .0011934    .0038095
      reform |   .0154363   .0265192     0.58   0.561    -.0365404    .0674131
       ageim |    .035919   .0064501     5.57   0.000     .0232769    .0485611
      ageim2 |  -.0005505   .0001104    -4.99   0.000    -.0007669   -.0003341
             |
        cont |
          2  |   .0145196   .0367016     0.40   0.692    -.0574143    .0864534
          3  |   .0749257   .0380321     1.97   0.049     .0003841    .1494673
          4  |   .0958305   .0442913     2.16   0.030     .0090211    .1826398
          5  |  -.1898142   .0578984    -3.28   0.001     -.303293   -.0763353
             |
      gender |   .0392638   .0076544     5.13   0.000     .0242615    .0542661
             |
         utd |
          5  |   .0025434   .0234718     0.11   0.914    -.0434605    .0485474
          6  |  -.0518784   .0147667    -3.51   0.000    -.0808206   -.0229362
          7  |  -.1241837   .0168048    -7.39   0.000    -.1571206   -.0912469
          8  |   .0117158   .0264611     0.44   0.658     -.040147    .0635787
             |
    fullfort |   .0287655   .0169997     1.69   0.091    -.0045533    .0620844
       gift0 |  -.2549603   .0148562   -17.16   0.000    -.2840779   -.2258427
   gift_nor0 |   .2528537    .035273     7.17   0.000     .1837198    .3219876
    gift0_10 |   .2556558   .0124283    20.57   0.000     .2312968    .2800148
gift_nor0_10 |   .1470822   .0144497    10.18   0.000     .1187613    .1754032
------------------------------------------------------------------------------
```

Table 14. Regression results using probit regression with marginal effects. Dependent variable In Norway for 5 years. Fimited sample:

```
Average marginal effects                        Number of obs   =      16786
Model VCE    : Robust

Expression   : Pr(inor5), predict()
dy/dx w.r.t. : lngdp_pc dist dist2 trend trend2 reform ageim ageim2 2.cont 3.cont
4.cont 5.cont
               gender 5.utd 6.utd 7.utd 8.utd fullfort gift0 gift_nor0 gift0_5
gift_nor0_5 educ

------------------------------------------------------------------------------
             |            Delta-method
             |      dy/dx   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    lngdp_pc |  -.0337418    .007421    -4.55   0.000    -.0482867    -.019197
        dist |  -.1431655   .0172756    -8.29   0.000    -.1770251   -.1093059
       dist2 |   .0086362   .0011146     7.75   0.000     .0064515    .0108209
       trend |  -.0627618   .0074775    -8.39   0.000    -.0774175   -.0481061
      trend2 |   .0030689   .0004247     7.23   0.000     .0022365    .0039013
      reform |   .0349096   .0284668     1.23   0.220    -.0208843    .0907035
       ageim |   .0382828   .0069479     5.51   0.000     .0246651    .0519004
      ageim2 |  -.0006169   .0001179    -5.23   0.000    -.0008479   -.0003859
             |
        cont |
          2  |   .1220048   .0454211     2.69   0.007      .032981    .2110286
          3  |    .232244   .0398349     5.83   0.000      .154169     .310319
          4  |   .2000884   .0432221     4.63   0.000     .1153747    .2848021
          5  |  -.2956774   .0346684    -8.53   0.000    -.3636263   -.2277285
             |
      gender |   .0292065   .0080285     3.64   0.000      .013471    .0449421
             |
         utd |
          5  |   .0887366   .0269762     3.29   0.001     .0358643    .1416089
          6  |  -.0308356   .0158911    -1.94   0.052    -.0619815    .0003103
          7  |  -.1249578   .0171541    -7.28   0.000    -.1585793   -.0913363
          8  |    .052331   .0255039     2.05   0.040     .0023443    .1023176
             |
    fullfort |  -.0015387    .019444    -0.08   0.937    -.0396483    .0365708
       gift0 |  -.3247145   .0187945   -17.28   0.000    -.3615511   -.2878779
   gift_nor0 |   .2968045   .0410128     7.24   0.000      .216421    .3771881
     gift0_5 |   .3074993    .015941    19.29   0.000     .2762554    .3387431
 gift_nor0_5 |   .1238419    .021818     5.68   0.000     .0810795    .1666044
        educ |   .0023116   .0011317     2.04   0.041     .0000935    .0045298
------------------------------------------------------------------------------
```

Table 15. Regression results using probit regression with marginal effects. Dependent variable In Norway for 10 years. Limited sample:

```
Average marginal effects                        Number of obs   =      10126
Model VCE    : Robust

Expression   : Pr(inor10), predict()
dy/dx w.r.t. : lngdp_pc dist dist2 trend trend2 reform ageim ageim2 2.cont 3.cont
4.cont 5.cont
               gender 5.utd 6.utd 7.utd 8.utd fullfort gift0 gift_nor0 gift0_10
gift_nor0_10
               educ

------------------------------------------------------------------------------
             |            Delta-method
             |      dy/dx   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    lngdp_pc |  -.0125115   .0069333    -1.80   0.071    -.0261005    .0010775
        dist |  -.0944767   .0165828    -5.70   0.000    -.1269784   -.0619749
       dist2 |   .0059836   .0010996     5.44   0.000     .0038285    .0081387
       trend |  -.0293549   .0090832    -3.23   0.001    -.0471577   -.0115521
      trend2 |    .001848   .0007271     2.54   0.011     .0004229     .003273
      reform |    .018683   .0304966     0.61   0.540    -.0410892    .0784552
       ageim |   .0321142   .0072166     4.45   0.000       .01797    .0462585
      ageim2 |  -.0004789   .0001231    -3.89   0.000    -.0007203   -.0002376
             |
        cont |
          2  |   .0431709   .0457339     0.94   0.345    -.0464659    .1328077
          3  |   .1322625   .0473042     2.80   0.005     .0395481     .224977
          4  |   .1207289   .0520356     2.32   0.020      .018741    .2227167
          5  |  -.2381786   .0376378    -6.33   0.000    -.3119474   -.1644097
             |
      gender |   .0378473   .0081042     4.67   0.000     .0219633    .0537312
             |
         utd |
          5  |   .0076288   .0267587     0.29   0.776    -.0448173    .0600749
          6  |  -.0558803   .0161354    -3.46   0.001    -.0875051   -.0242556
          7  |  -.1156677   .0187217    -6.18   0.000    -.1523616   -.0789738
          8  |   .0125183   .0290657     0.43   0.667    -.0444494     .069486
             |
    fullfort |   .0220697   .0187456     1.18   0.239     -.014671    .0588104
       gift0 |  -.2502606   .0166031   -15.07   0.000     -.282802   -.2177192
   gift_nor0 |   .2233984   .0372383     6.00   0.000     .1504127    .2963842
    gift0_10 |   .2563124   .0142797    17.95   0.000     .2283248    .2843001
gift_nor0_10 |   .1522618   .0162081     9.39   0.000     .1204945     .184029
        educ |   .0013738   .0010133     1.36   0.175    -.0006123    .0033599
------------------------------------------------------------------------------
```

Table 16. Variable explanations:

lngdp_pc	ln GDP per capita
dist	Distance
dist2	Distance Squared
trend	Year at entry - 1990
trend2	Year at entry – 1990 squared
reform	Reform 2001
ageim	Age at entry
ageim2	Age at entry squared
cont	Continents
1	Europe as base level, omitted
2	Africa
3	Asia
4	Americas
5	Oceania
Gender = 1	Female
Fullfort	Completed Education
Gift0	Married before arrival
Gift_nor0	Married before arrival w/ Norwegian citizen
Gift0_5/10	Married during stay
Gift_nor0_5/10	Married during stay w/ Norwegian citizen
utd	Education level
4	Secondary level, omitted
5	End of secondary level
6	Bachelor level
7	Master level
8	Ph.D level
educ	Returns to education