



LUND UNIVERSITY

School of Economics and Management

Master Programme in Innovation and Spatial Dynamics

## Determinants of immigration intentions: a special focus on international students

*by*

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*Abstract:* The intensifying global race for talent increases the need of efficient policies and tools aimed at attracting and retaining highly-skilled individuals from around the world. For this purpose, a large strand of literature started examining the determinants of skilled immigration. However, little attention has been paid to the case of international students, which represent a special sub-group of highly-skilled immigrants with their own motivations for immigration. This thesis aimed at studying the factors influencing students' choice of location after their graduation, by focusing on the case of Sweden as a destination country. The analysis is conducted by using a probit regression model based on the alumni survey of the Swedish Institute scholarship programmes. According to the results, the economic factors, namely income and inequality levels in the source country do not have any significant effect, whereas social factors in the source country have negative impact on the probability that the students will stay in Sweden after graduation. The results further suggest that the links between the source country and Sweden proxied by the immigrant community size and trade level also have an effect on the probability of students' stay in Sweden.

**Key words:** International students, high-skilled immigration, immigration, determinants

**EKHS32**

Master thesis, Second Year (15 credits ECTS)

June 2019

Supervisor: Claudio Fassio

Examiner: Olof Ejermo

Word Count: 12,638

# Acknowledgements

I would first like to thank my supervisor Claudio Fassio for his time and support during the development of the thesis. In addition, I would like to express my special thanks to the Swedish Institute for both granting me a study scholarship and sharing their data for this thesis.

# Abbreviations

GDP Gross Domestic Product

HEI Higher Educational Institution

ILO International Labour Organization

PPP Purchasing Power Parity

VIF Variance Inflation Factor

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# 1. Introduction

It is well-known that innovation is the key for achieving long-term and sustainable economic growth, while human capital, in its turn, is the main contributor to innovation. In the modern developed world, however, the shortage of high-skilled and more often specialized technical professionals has become a common challenge, since the local labour supply does not always meet the continuously growing demand. Given the unprecedented increases in international mobility in the recent years, immigration of high-skilled individuals is perceived as an important source of knowledge for countries aiming at filling the gap in the labour market and accelerating their innovation capacity. In the academic literature and in this thesis skilled migrants are described as managers, professionals or technicians holding a tertiary degree that move from one country to another with the purpose of permanent settlement (Tharenou, 2015). The empirical research shows that the high-skilled immigrants are accounting for a high share of patents, innovations, firm start-ups in a number of host countries. Despite the vast literature on the effect of highly-skilled immigrants on countries' economic performance, however, little attention has been paid to a special sub-group of skilled immigrants – international graduate students (Bijwaard & Wang, 2016).

As a result of the internationalization of educational programmes, the number of international students is increasing with high rates, exceeding almost four times the rate of total international migration (King & Raghuram, 2013). In OECD countries the number of foreign students has been growing. In Sweden the international students are making 6.6% of the total student population, which still has an increasing trend (OECD, 2019). The policy-makers are paying particular attention at attracting student immigrants. The reason is that foreign students possess knowledge, skills and abilities that might be invested in the host countries' economies (Chellaraj et al., 2008). In addition, compared to other types of high-skilled immigrants, students are young, more mobile, without family obligations and represent a rather huge pool of talent already settled in the host country (Bozionelos et al., 2015). It should be stressed here that international graduate students should be distinguished from international students in general, since they are more specialized in their field of study, have acquired more advanced skills, and therefore are more of interest for companies operating in the country (Bozionelos et al., 2015). Furthermore, such

students are attractive for their home countries as well, which means that they have alternative options when it comes to the choice of location after graduation (Bozionelos et al., 2015). Acknowledging these benefits brought by foreign graduate students, the host country authorities are developing special mechanisms for attraction and retention of these individuals after their graduation (Suter & Jandl, 2008). Despite the importance of international student mobility in today's highly globalized world, there is a lack of research on the determinants of their migration decision after graduation. In the existing literature, international students are more often regarded in the same group with other types of skilled immigrants (Bijwaard & Wang, 2016). This thesis aims at addressing this gap by examining the determinants of the immigration decision made by international students after the end of their study period at the host country.

## Research Objective and Scope

As already mentioned globalization has led to an increasing competition for the talent among developed countries, which have no other choice, but “to look for the best people irrespective of their country of origin” (Bozionelos et al., 2015; p. 1428). In particular, countries are designing and implementing respective policies for the attraction and retention of international students, which represent a desirable group of skilled immigrants for the host country (Suter & Jandl, 2008). Among such supporting mechanisms are the simplified labour migration policies or financing programmes initiated by the governments of developed countries for foreign students coming from developing countries. In order to develop effective policies and strategies aimed at maximizing the gains from the internationalized higher education system, in-depth understanding of factors influencing graduates' choice is important. The overall objective of this thesis is to examine the main economic and social factors in the host and home countries that influence the choice of location among international students after their graduation.

The study is focused on the case of foreign graduate students at Swedish universities, taken into account the small size of the Swedish economy and its need of skilled people in sustaining the position as one of the top innovative economies in the world. In addition, due to the highly-internationalized Swedish higher education system, the country manages to attract more “positively selected” people in terms of skill level, in comparison to other European countries,



such as Germany, the Netherlands, France or Finland (SAGPA, 2017; p. 35). Moreover, Sweden is investing heavily in making education at Swedish HEIs accessible to students from third-world countries as well. For this purpose grant programmes are established by the Swedish government in order to promote the international mobility of students studying at Swedish HEIs (SHEA, 2018). Thanks to such funding programmes, in 2017 almost 30% of registered foreign tuition-fee paying students received full or partial financing for their studies SHEA (2018). One of these grant programmes established by the Swedish government are the scholarship programmes administrated by the Swedish Institute (SHEA, 2018). The mission of the Swedish Institute in general is building long-term relations between Sweden and its partner countries, in which promoting educational mobility is one of the applied mechanisms (Swedish Institute, 2019a). Therefore, this thesis focuses on studying the incentives of immigration among international students, by taking the case of Swedish Institute's scholarship recipients as a scope of the study. For the analysis, the alumni survey data of the Swedish Institute scholarship holders is used to examine the determinants of students' migration decision.

The contribution of the thesis is three-fold. Firstly, it examines the economic and social determinants of immigration decision among a special subgroup of highly-skilled immigrants – international students. In contrast to other types of highly-skilled individuals, international students are younger and more mobile, have less obligations or family ties, as well as are already settled in the host country (Bozionelos et al., 2015). Given these unique characteristics of foreign students, however, they have been paid not enough attention in the academic literature. Secondly, most of the studies in the literature aimed at studying international students' location choice after graduation have more qualitative focus and use interviews with fresh graduates as an analysis tool (King & Raghuram, 2013). This thesis uses quantitative approach for addressing the research questions. Thirdly, the Swedish Institute's alumni survey data is used for the analysis, which has not been applied to similar studies, to the best of my knowledge.

## Thesis outline

The thesis is composed of 8 sections. After introducing the background of the study and its objectives, in the section 2 a brief literature review is presented. The literature review starts with

illustrating the findings in the innovation literature about the effect of international immigrants and the incentives of destination countries in attracting talented people. Then, it focuses on the determinants of location choice among skilled immigrants and international students, in particular, and at the end of the section formulates the hypotheses of the study. Section 3 presents the context of the thesis, specifically the internationalization of higher education and labour migration policy in Sweden. Data and methodology of the analysis are presented in the section 4, followed by the illustration of the results in section 5 and the discussion in section 6. The section 7 presents the limitations of the study, and in the end, the final section 8 concludes the findings.

## 2. Literature Review

Literature on international mobility discusses the phenomenon from the perspective of immigrants, their home and host countries. Having the big picture is important for in-depth understanding of the causes and consequences of international skill migration. Given this, the following literature review will start with discussing the impact of international immigration on the innovation performance of destination countries. It aims at explaining the incentives of host countries in promoting the attraction and retention of high-skilled immigrants, including international students. The following sections will thoroughly discuss the causes of migration from the perspective of immigrants by focusing on high-skilled ones.

### High-skilled immigration and innovation

The dramatic increase in the volume of migration caused by globalization and its economic consequences has become a key area of research in the academic circles. In particular, the more than doubling of the number of skilled migrants in OECD countries led researchers to examine its impact on the innovative capacity of these countries, given that innovation is the driving force behind the economic growth (Ozgen et al., 2012). It is believed that the diversity brought by the immigrants is contributing to the innovative capacity of the countries, regions and firms in accordance to the concept of Jacobs' externalities (Jacobs, 1969). Although the empirical literature about the effects of immigration on innovation is not rich enough, especially in the case of European countries, the existing literature provides evidence of positive impact from immigration on innovation level on the long-run (Ejeremo & Fassio, 2018). A common feature in these empirical studies is that innovation in the destination country is boosted by the immigration of highly-skilled individuals. Specifically, the findings of Hunt and Gauthier-Loiselle (2010) based on US data show that there is a significant positive relationship between the immigration and patenting activity. Ozgen et al. (2012) conducted their study for European NUTS2-level regions. According to their results, not the quantity of immigrants, but the "diversity of abilities brought by the immigrants" (p. 291) might have positive and complementary effect on

innovation. Niebuhr (2010) also shows how diversity among the immigrants accelerates patent applications in German regions.

Some of the empirical research finds evidence that among the highly-skilled immigrants particularly innovative are foreign students, including PhD and postgraduate students. In particular, Hunt and Gauthier-Loiselle (2010) reveal that foreign college graduates contribute twice more to the patenting in comparison to their native counterparts. Similar conclusions are made by Chellaraj et al. (2008) who show that although both skilled immigrants and international graduate students have significant positive impact on patent application, the effect of the latter group is much higher. By building on the findings of Hunt and Gauthier-Loiselle (2010), Hunt (2011) based on 2003 US national survey of college graduates also confirms that immigrants who originally entered the country on student/trainee visas or temporary work visas have higher levels of patenting and publishing, as well as wages than natives and immigrants who arrived as legal permanent residents. The author explains this by their higher education and field of education. Hunt (2011) also shows that depending on education, such immigrants are more likely to engage in entrepreneurial activities than the other groups.

The underlying channels through which skilled immigrants, including foreign graduate students, influence the innovation and growth have attracted considerable attention. Ozgen et al. (2012) have distinguished five mechanisms through which immigration pushes innovation. First three mechanisms are about the “population size effect”, “population density effect” and “population share effect”, which work through the increases in local aggregate demand that might augment the production level, attract additional labour and investments, enhance entrepreneurship and eventually accelerate the product and process innovations (Ozgen et al., 2012). The fourth mechanism concerns the novelty brought by the immigrants to the human capital stock of their host countries; new ideas and knowledge embodied in the immigrants contributes to the innovation capacity in the host country (Ozgen et al., 2012). Finally, the fifth mechanism through which immigration might enhance innovation is the cultural diversity in the sense of Jacobs’ externalities, according to which new ideas might emerge in diverse environments (Ozgen et al., 2012). Furthermore, immigrants might impact the innovation capacity of the host country indirectly; for instance, through international trade. In particular, Murat (2014) studied the effect of network ties formed during the study years between the international students and the UK, on

the bilateral trade flows. The study findings show that there is a strong impact of networks on the bilateral trade of the UK, which is more significant for countries with different cultural and institutional set-up.

The potential contribution of highly skilled foreigners to the innovation level has encouraged the authorities of the immigrant-receiving countries to take measures for attracting foreign skilled individuals. This has led to a competition for talented immigrants not only between countries, but also between regions, which necessitates effective implementation of immigration policies (Suter & Jandl, 2008). In order to develop such policies, first and foremost, the factors influencing the migration decision need to be understood.

## Determinants of international migration

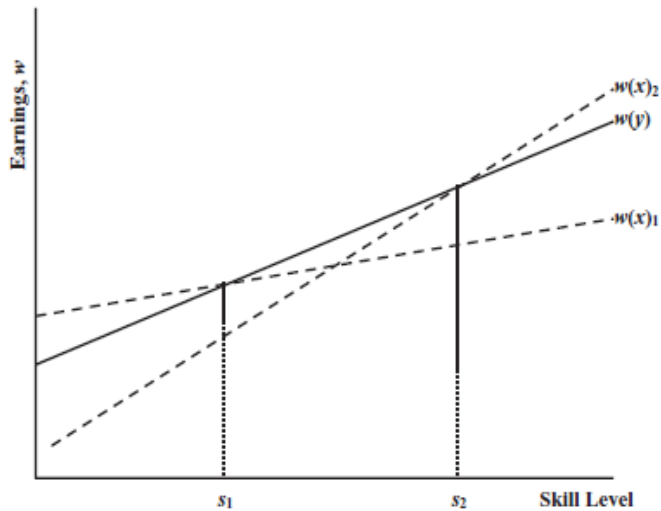
Given the economic and social benefits of international migration, scholars in various fields have tried to identify the factors influencing students' decisions concerning studying abroad, country of choice, as well as the consequences for host and sending countries. The issue is that talented people are not evenly distributed in space, which makes the attraction and retention of such individuals a major policy concern in the host country (Mosneaga & Winther, 2013). In the recent decades there has been a growing interest in the academic world towards the determinants of migration among the skilled individuals. The literature on international migration reveals that both economic and non-economic factors play a major role in the decision making process concerning the location choices of highly-skilled immigrants.

### *Economic factors*

To start with, according to the economic literature on international migration immigrants are not randomly selected (Borjas et al., 2018). According to this literature, the outcome of immigration decision is determined by the “push and pull factors”, that is, the perceptions of labour market conditions among the immigrants (Mayda, 2010). In his influential paper Borjas (1987) shows that the main determinant of immigrant selection is the difference in the rate of return to skills in

sending and receiving countries. He uses a basic framework used in the international migration literature for modeling skill selection. The model is called Roy model (Roy, 1951), and was first introduced in the migration literature by him.

According to the Roy model, since the skills can be transferred across countries, the mobility of individuals is determined by the differences between the rate of return to skills at home and destination countries (Borjas et al., 2018). An important contribution of this model is that a country like the US might attract highly-skilled individuals from relatively egalitarian countries where the rate of return is much lower, whereas from countries with high income inequality mostly low-skilled people are attracted (Borjas et al., 2018). In such countries highly-skilled individuals prefer staying in their home countries and exploiting the return to their skills (Borjas et al., 2018). Figure 1 below represents the illustration of the Roy model taken from Belot & Hatton (2012).  $w(y)$ ,  $w(x_1)$  and  $w(x_2)$  are the wage schedules in destination and 2 origin countries, respectively. They are increasing along with the skill level, and the slope of each line represents the return to skill in each country. Therefore, in country  $x_1$ , people with skill level exceeding  $s_1$  tend to migrate to country  $y$ , which is a type of positive selection. On the contrary, from country  $x_2$  only people with skill level below  $s_2$  have incentive for migrating, which represents a negative selection. Borjas, by applying Roy model in several of his studies, showed that the wage differential for immigrants in the US depends negatively on the inequality and positively on the average income in their country of origin. Many other scholars have used Roy model in their analysis. By using its various specifications, they have showed that economic factors, namely income level and inequality are important determinants of international migration.



**Figure 1: Wage schedules for destination and source countries**

Source: Belot & Hatton (2012)

In contrast to the Roy model, Groger and Hanson (2011), by applying an alternative framework, show that the highly-skilled immigrants make their decision based on absolute differences between sending and receiving countries. Another study of Groger and Hanson (2015) confirms that economic factors are the most important determinants of foreign-born students' location choices. Specifically, they examine how the economic and political conditions impact the intentions of foreign-born students to stay in the US after graduation and find that they are more likely to stay in the US “during periods of strong US economic growth and during periods of weak home country economic growth” (p. S6). A number of other empirical studies confirm that the economic factors play an important role in the immigration process (i.e. Abramitzky, 2009; Rozenzweig, 2006, Belot & Hatton, 2012).

The costs of migration and the immigration policy in the host country are also considered to be essential determinants of migration decision (Ejermo & Zheng, 2018; Belot & Hatton, 2012). International migration costs include actual moving costs (e.g., cost of visa application), information searching cost (e.g., time spent on searching the process of visa application), social networks cost (e.g., give up part of social network in the home country), and adoption costs (e.g., learning a new language and institutions) in the host country (Ejermo & Zheng, 2018; p. 5). Belot and Hatton (2012) in their analysis of 21 destination countries and 70 source countries find that wage differences are less important factors. Instead, they show that cultural and linguistic

similarities, colonial legacies and physical distance, which represent the costs of migration, are the major determinants of immigrant selection. Furthermore, the authors point out that the poverty is another important factor, since it might constraint the immigration of many potential migrants from poor countries. Their results show that “the interaction between poverty and distance increases positive skill selectivity from a given source country”, which means that with the increase in geographical distance the poverty constraint becomes less important (p. 1125).

Mayda (2010) also find that pull factors measured by income opportunities in the destination country, are positively related to the emigration rate. Instead, push factors are not negatively related, and if they are, the effect is smaller than that of pull factors and insignificant, which the authors explain by the role played by destination country immigration policies. According to Mayda (2010), migration policies are not exogenous factor as it is assumed in the theory, but have an influence on the significance of push and pull factors. The reason is that “migration policies can be thought of as the outcome of a political economy model in which voters’ attitudes toward immigrants, interest-groups pressure, policy-makers preferences, and the institutional structure of government interact with each other and give rise to a final immigration policy outcome” (Mayda, 2010; p. 1271).

In addition to the economic factors, the political characteristics of source countries are also determining the self-selection of immigrants. In particular, as pointed out by Borjas (1987), political repressions, for instance in the Communist regimes, might affect the selection of immigrants. Brucker and Defoort (2009; p. 752) confirm this by arguing that in formerly communist regimes “the returns to education and non-observed abilities are lower ... than in Western countries, but still positive”.

In overall, economic and political characteristics are the main well-documented push and pull factors affecting the international mobility. However, the recent literature started investigating the phenomenon from different perspectives and revealed other equally important factors influencing the immigration incentives.



### *Non-economic factors*

A new wave of literature has emerged that criticized the view of immigration based solely on the push and pull factors. A number of studies have provided alternative and complementary explanations for the immigration decision. A special attention started to be paid to the immigration determinants of international students as a significant sub-group of highly-skilled immigrants. In overall, the research shows that individual, social and cultural factors are equally important in the immigration of highly-skilled individuals.

For international students the likelihood of permanent immigration is rather high, given the time period that they have for adjustment in the host country. The empirical study of Baruch et al. (2007) finds that in addition to the labour market conditions, the decision of international students to remain in the country of studies after graduation is also related to their social ties and adjustment level in the host country. Specifically, in the case of high level of adjustment, support from their teachers, university and other students, weak social ties with their family members, foreign students are more likely to stay in the country of studies (Baruch et al., 2007). Similarly, De Grip et al. (2010) also state that income differences are not the only significant determinants for students' choice of immigration. Using a data of science and engineering students from 12 European countries they show that labour market opportunities, previous migration experience and international student exchange are significant factors.

The social ties within the ethnic communities are another factor influencing the migration processes. It is believed that during the history ethnic community members have played a major role in securing jobs for the newly arrived immigrants, such as the European or African-American labour networks in the US (Munshi, 2014). The practice exists in the modern world as well; in the imperfectly functioning markets, including labour market, the role of social networks becomes important (Munshi, 2014). For instance, in the case of recruitment need, the incumbent employees of the firm might refer highly-skilled individuals from their communities to the employer (Munshi, 2014). Taken this into consideration, Munshi (2014) empirically shows how community networks directly support the international mobility. Furthermore, Manchin and Orazbayev (2018) have thoroughly examined the role of close and broad social networks abroad and at home on the individuals' intention to migrate. Their findings reveal that the social networks at the destination are the most important determinants of international migration,

explaining around 37% of variation in the probability intentions. They also show that networks are more important determinants compared to other aspect including economic ones. There are also studies, which make a distinction between high-skilled and low-skilled immigrants in terms of the effect of immigrant community. Specifically, McKenzie and Rapoport (2010), based on the US – Mexico migration patterns show that networks formed in the source country are increasing the proportion of low-skilled immigrants.

The research shows that demographic factors are also playing a role in the migration of talented individuals. In particular, Geddie (2013) discusses that the gender-related issues, such as traditions, views of family and parenthood, might limit the freedom of individuals in their choices. According to her, although the different socio-cultural norms in the host country change the perceptions among female migrants, and lead to their empowerment, the process is rather slow. Moreover, Groyberg (2008; p. 1) argues that the performance of stars falls, but not in the case of women. He explains this by arguing that, firstly, “high-performing women build their success on portable, external relationships – with clients and other outside contacts”; and secondly, “women considering job changes weigh more factors than men do, especially cultural fit, values, and managerial style”. Therefore, the differences between genders in their perceptions about finding a job have the potential of affecting their post-graduation plans. However, as King and Raghuram (2013) note, the role of gender in the literature of international migration still remains underestimated, particularly in the case of student migration.

Qualitative studies of international student migration reveal more determinants that remain unobserved in quantitative analyses. The study of Geddie (2013) based on in-depth interviews with foreign graduates in the UK and Canada shows the importance of transnational social ties and relationship considerations in post-graduation decisions. Bozionelos et al. (2015), by drawing on Social Cognitive Career Theory, show that perceived external constraints, such as labour market expectations or family pressure to return, international student experience, adjustment in the host country, individual factors, namely self-efficacy with respect to working abroad and outcome expectancy are all somehow related to the decision of students staying in the country of study after graduation. Wu and Wilkes (2017) have analyzed the immigration plans of international graduate students from the point of view of sociology. They argue that the decision

of students is related to their perception of “home”. Those students that view the host country as a temporary place to live and study are less likely to stay there after graduation.

Therefore, it can be concluded that the individuals’ preferences and current situation are often playing a major role in the decision-making process of international graduates in terms of location choice. As Mosneaga and Winther (2013) show by examining the study-to-work transition of international students, the final decision of graduates results from the interplay of numerous macro and micro level factors, and therefore, cannot be accurately anticipated. However, understanding the observable characteristics can be crucial from both academic and policy-making perspectives.

## Hypotheses

As the findings of studies mentioned in the literature review show, the economic conditions represent an important incentive for high-skilled immigrants when it comes to choosing the country of permanent residence. In particular, higher income differences between the source and destination countries increases the number of immigrants, regardless their skill level (Brucker & Defoort, 2009). Moreover, according to the Roy model, in relatively unequal countries the skill premium is much higher, which implies that high-skilled people are likely to stay in their source country, whereas low-skilled ones tend to emigrate, and vice versa (Borjas, 1987). Taking this as a point of departure, it might be expected that for international graduate students as well, lower inequality in the source country increase the probability of their stay in the destination country, since they are highly-skilled and might have incentives of exploiting their skill premium. Taken this into consideration, the first 2 hypotheses might be formulated in the following way:

*H<sub>1A</sub>: Higher income level in the home country does not have an impact on the probability of staying in the destination country among the international students after their graduation.*

*H<sub>1B</sub>: Higher income inequality in the home country does not have an impact on the probability of staying in the destination country among the international students after their graduation.*

Human rights, intellectual property rights, level of democracy, rule of law and other political and social factors might influence the incentives of immigrants in their decision-making process. Borjas (1987) argues that immigrants from countries with long history of political repression have higher rates of adaptation in the US labour market. Brucker and Defoort (2009) also argue that the political environment in the source country might affect the immigration intentions among both skilled and unskilled immigrants. It is expected that students, who are more ambitious and have already experienced living in a democratic society, might look for higher levels of freedom and right protection in their country of residence. Therefore, the second hypothesis of the thesis will be:

*H<sub>2</sub>: Lower level of social and political freedom in the home country does not affect the probability of staying in the destination country among the international students after their graduation.*

The literature review showed that one of the factors that have an impact on people's immigration decision is the established links between the source and host countries. Specifically, following the findings of Munshi (2014) and others, the stock of immigrants settled in the host country eases the mobility of others coming from the same country. Hence, it is expected that students, which are representative of larger communities in the host country are more likely to stay there after graduation. In addition to the findings in the literature, in countries like Sweden informal networks, such as friends and relatives, are an important source of information and channel to the job market, which results in "substantial ethnic workplace segregation" (OECD, 2016; p. 154). Moreover, it is mentioned in the literature that the transnational links are also playing role in the immigration processes. Taken these into account, the third hypothesis will be:

*H<sub>3</sub>: Well-established links between the destination and source countries does not impact the probability of staying in the destination country among the international students after their graduation.*

### 3.High-skilled immigration in Sweden

In the recent decades the world has seen dramatic increases in high-skilled immigration, although the share of people living out of their countries of birth remained more or less the same since 1960 (SAGPA, 2017). It is striking that not only the composition of skilled immigrants has changed, but also skilled immigration became highly-concentrated in a few destination countries, the United States, United Kingdom, Canada and Australia being the top 4 receiving countries (SAGPA, 2017). Although Sweden has historically also been a major migrant-receiving country, its focus has mainly been on refugees and family reunifications (Ejermo & Zheng, 2018). The proportion of foreign-born citizens in the total population of Sweden increased from 11.3% in 2000 and 14.7% in 2010 to more than 19% in 2018 (Statistics Sweden, 2019a). However, the picture is changing in terms of skill composition among immigrants in Sweden (Ejermo & Zheng, 2018). According to the SAGPA (2017), in 2010, Sweden was the 11<sup>th</sup> highly-skilled immigrant receiving country. Another remarkable trend in the skilled immigration is that the range of source countries is continuously expanding (SAGPA, 2017). This is true in the case of Sweden as well. According to the data of Statistics Sweden (2019b) the number of immigrant-sending countries reached from 160 in 2000 to 180 in 2016. Such global trends increase the competition among the countries in attracting talented individuals, which makes the effective immigration policies a high priority.

#### Swedish Labour Migration Policy

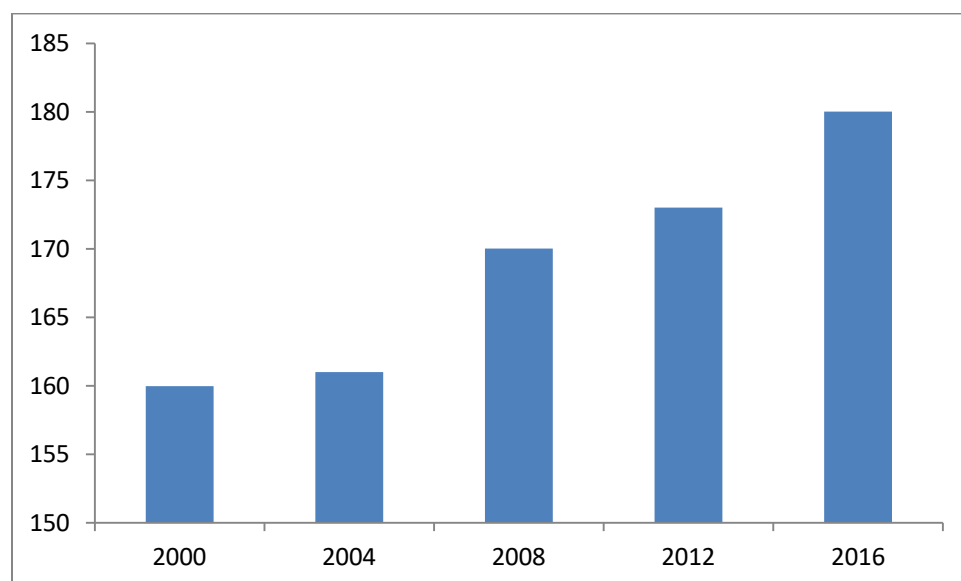
The so-called global “race for talent” resulted in number of immigration policy approaches, such as the point-based system in Canada, Australia and the UK, or the annual quantity caps used in the United States (SAGPA, 2017). The lack of relevant research makes it hard to assess the effect of each policy approach; however as noted by SAGPA (2017), the policies are mostly about 2 main objectives. The first one “needs to let them come”, which assumes less restrictive approach towards the immigration of at least high-skilled individuals, and second one “needs to let them stay”, which is about the simplified process for permanent residency of citizenship. In contrast

to many other countries, the Swedish immigration policy is not based on quotas as in Norway or labour market needs as in Denmark or specific professional fields as in Finland (SAGPA, 2017). In 2008, the Swedish Government conducted reforms in Swedish Immigration policy. According to the new law on labour, the work permits are granted based on the demand of employers, by taking the recruitment needs of employers as the point of departure (Ostling, 2013). However, the employers are still obliged to respect the EU community preference, according to which EU and Swiss citizens are prioritized in the recruitment (Törngren & Holbrow, 2016). As a consequence, the focus of the Swedish policy is not the labour market needs, and is not aimed exclusively at high-skilled labour (Ostling, 2013). According to the law, work permits are granted for the duration of their employment contract and a maximum of 2 years, with a possibility of extension. After 4 years of work experience out of the previous 5 years, the immigrants are granted permanent residence permit. Regardless of their skill levels, migrant employees have access to the same rights. International students, similar to work permit holders, are allowed to work during their study period, although some restrictions exist for non-EU students in terms of the working hours. After graduation, foreign students are also allowed to extend their residence permit and stay in the country for a period of 6 months to look for a job or start a business.

Despite the relatively liberal labour migration policy in Sweden, some barriers exist which hinder the attraction and retention of foreign professionals. Among the most common are language barriers and social integration issues (Törngren & Holbrow, 2016). Furthermore, Axelsson (2017) argues that even IT specialists, who are highly demanded in Sweden, are facing some constraints in their settling process. Specifically, according to her, waiting and delays related to their admission, work permit application and settlement procedures are hindering the mobility of highly-skilled individuals.

The evaluation of the new labour migration policy carried out by OECD (2011) shows that the new policy did not result in remarkable increases of working migrants. Figure 2 presents the number of work permits granted since 2006. As it can be seen, the increase in given work permits took place already before 2008 (Ostling, 2013). The main non-EU source countries include India, Iran, China, Thailand, Pakistan, Ukraine, Russia and Turkey (See Appendix 1). The selection differs depending on the migrant-sending country (SAGPA, 2017). For instance,

immigrants from China and India are positively selected, whereas Russia and Mexico demonstrate negative selection patterns (SAGPA, 2017). Although the number of granted work permits to skilled migrants is increasing, their retention has been quite poor (Törngren & Holbrow, 2016). In 2009, out of 7200 labour migrants excluding seasonal workers only around



**Figure 2: Number of source countries of immigrants**

Source: Statistics Sweden, 2019b

3200 remained in the country at the end of the year and no more than 2500 by the end of 2012 (Bevelander et al., 2014). A similar pattern can be seen for technical professionals; from the 2200 computing professionals that received their work permits in 2009, only 170 stayed in Sweden in 2012 (Bevelander et al., 2014).

The immigrant population of Sweden, however, consists of relatively highly-skilled individuals in comparison to other European countries, despite the large inflows of low-skilled immigrants and asylum-seekers in the recent years (SAGPA, 2017). In particular, noteworthy is Sweden's ability of attracting skilled female migrants, the large share of which has a secondary or tertiary education (SAGPA, 2017). Moreover, Sweden is also keeping the balance of high-skilled immigration in terms of gender equality (SAGPA, 2017). In 2018 the top sending countries for both female and male migrants are Syria, India, Afghanistan, Eritrea and Iraq. However, the overall skill distribution of immigrants in Sweden shows that there are very few individuals at the very top of skill level, which is typical to other Nordic countries as well (SAGPA, 2017).

The major challenge for the policy-makers remains the retention and utilization of the potential of highly-skilled immigrants. The role of non-governmental bodies, in particular universities and firms, is huge in increasing the quality of the immigration (SAGPA, 2017). Specifically, the universities are attracting number of international students, which represents a large pool of talent for the host country. Furthermore, as a rule, with higher education from the universities of the host country the chance of finding a job increases.

## Study opportunities for international students in Sweden

Sweden is one of the countries with good reputation in terms of education and innovation. The country positions itself as “one of the most attractive, international knowledge nations with world leading quality of education and research” (SGI, 2018; p. 14). In 2011, around 7274 students received residence permit as a students, while in 2015 this figure became 11,416 (Migrationsverket, 2019). The reason of such a dramatic decrease is the introduction of tuition fees. In 2011, Sweden introduced tuition fees for students from outside EU/EEA, which sharply dropped the supply of international students. Parusel (2012) shows that although the number of granted residence permits to students declined by more than 50%, the number of non-EU citizens that changed their student residence permit to working residence permit almost doubled. The number of tuition fee paying students, however, increases over time, in 2018 reaching to more than 13.000. Asian countries, namely China, India and Bangladesh are the major source countries of international fee-paying students (see Appendix 1).

With the introduction of tuition fees in Swedish universities, number of grants and scholarship programmes became available for allowing the qualified students to finance their studies. Universities and other HEIs have their own grant schemes in the form of tuition waiver such as the Lund University Global Scholarship or Uppsala IPK Scholarships (SHEA, 2018). In addition to the funding of HEIs, after the introduction of tuition fees, the Swedish government established 2 grant programmes that are administered by the Swedish Council for Higher Education and the Swedish Institute (SHEA, 2018). According to the 2018 Status report of SHEA (2018), as of 2017 autumn, there were 6810 fee-paying students registered in the HEIs, 29% of which had a Swedish study grant covering part of or all the cost of tuition. Furthermore, the share of female



students receiving study grant was 33%, which was much higher compared to the 26% of men (SHEA, 2018). Among the HEIs, Umeå University and Lund University had the largest share of students financed through a study grant in 2017, 55% and 54%, respectively (SHEA, 2018). Hence, almost one third of non-EU students studying in the Swedish HEIs are financially supported, which to some extent reduces the negative effect of the tuition fee introduction. Moreover, study grants are offered to highly-qualified students, which means that potential good professionals are selected that later can be supplied to the Swedish labour market.

According to SHEA (2018), the time needed for being established in the Swedish labour market after graduation is rather short; in 3 years after graduation 82% of second and third-cycle graduates were established in 2017. There is a difference between the genders, men having 5 percentage points higher establishment rate, which, however, narrows down for the third-cycle graduates (SHEA, 2018). The SHEA (2018) Status Report also shows that differences exist also in terms of the Swedish or foreign background and field of study. Specifically, graduates with Swedish background have much higher establishment rates in all graduation levels, but it is the largest for third-cycle graduates (SHEA, 2018). In regards to the effect of study programme, graduates in the field of engineering and construction have the highest rates at the establishment in the labour market, while humanities and art graduates are at the lowest end; this difference reaches to the highest level for the third-cycle graduates (SHEA, 2018). .

In passing, Sweden has a highly internationalized education system, with well-established mechanisms for welcoming international students from the world's less developed countries. Such mechanisms allow more positive selection of talented individuals, which might otherwise be constrained given the high level of migration costs. Furthermore, the labour migration policy in Sweden provides more equal opportunities and less restrictive requirements for international students compared to other countries. Taken all these factors into consideration, studying the determinants of immigration among international students in the Swedish context, might give better idea about them. Furthermore, taking international students holding governmental scholarships as a sample of the study diminishes the potential negative effect of migration costs and immigration policy, and therefore gives clearer picture.

## 4. Data and Methodology

### Swedish Institute Alumni Survey

The aim of this study is examining the economic and social determinants of international students' migration decisions after their graduation from Swedish universities. For this purpose the alumni survey conducted by the Swedish Institute will be used. The Swedish Institute is a public agency, which promotes the international exchange in the areas of culture, education and research, aiming at strengthening the relationships between Sweden and partner countries (Swedish Institute, 2019a). As one of the core pillars of its mission is educational mobility, Swedish Institute provides financial and other types of assistance to international students from around 140 countries of the world through scholarship and grant programmes (Swedish Institute, 2019a). The programmes range from short-term summer courses to scholarships for university degree programmes (Swedish Institute, 2019a). The scholarships are granted to students who have been admitted to a Swedish HEI for a study programme with at least 60 ECTS for Master level studies or above (Swedish Institute, 2019a). The criteria of the programmes require that the applicant should be liable to pay tuition fee for studies in Sweden, is not a citizen of Sweden, does not hold a degree from a Swedish HEI, and has not resided in Sweden for the last 2 years prior to the scholarship period (Swedish Institute, 2019a). Another important requirement of the scholarship programmes is that the applicants should have demonstrated strong "intellectual ability and leadership potential" with their past experience (Swedish Institute, 2019a). It should be stressed, however, that the requirements and criteria of the scholarship programmes have been changed during the years.

Using the survey data of Swedish Institute scholarship holders allows obtaining a sample of highly-skilled and promising individuals, who received their degrees from Swedish universities, are not constrained by financial costs or immigration policy requirements and have already experienced living in Sweden. To the best of my knowledge, the survey has not been used before for academic research, but was conducted for programme evaluation purposes for the internal use of the Swedish Institute (personal communication, 28 January, 2019).

## Dataset Description

The survey was conducted by the Alumni Relations team of the Swedish Institute during 2018 and 2019 for each scholarship programme separately (personal communication, 28 January, 2019). Around 9000 alumni were surveyed who studied in Sweden during the period between 2000 and 2018 through the Swedish Institute's educational programmes (personal communication, 28 January, 2019). The survey was carried out through an online questionnaire and included questions about their country of citizenship when applying to the scholarship programme, the start and end dates of the programme, their current country and city, occupation, employer information, as well as some other demographic characteristics, namely gender and birth year (personal communication, 28 January, 2019). The questionnaire was completed by nearly 2900 alumni (personal communication, 28 January, 2019). For the study purposes of this thesis, only the data of individuals on Master and PhD level studies were included in the sample shared by the Swedish Institute. The overall number of the initial dataset was composed of 1690 observations.

Since the dataset was comprised of several surveys, firstly, the data was cleared by bringing all the information to a standardized format. Next, although the dataset included scholarship programmes that covered Master and PhD level studies, there were observations, which had a short period of stay in Sweden (less than 6 months). Those observations (183) were dropped. Moreover, there were students who indicated Sweden as their country of residence when receiving the scholarship offer. These 107 observations were also dropped. There are 346 respondents who mentioned countries other than Sweden or their home country, as a country of their current residence. They were also excluded from the sample. The reason of this exclusion is that the incentives among graduates to move to a 3<sup>rd</sup> country are out of the scope of this thesis. These students are choosing a new destination after their graduation, about which they know much less than their home countries or Sweden and therefore, their choice might be motivated by totally different factors. Thus, by dropping almost 38% of the initial observations, the final sample is composed of 1054 individuals. The Stata further drops 11 observations, for which the variable age is missing.

Since the thesis aims at understanding the effect of differences in economic and social conditions in home countries and Sweden, the survey data is complemented by a few other economic and social indicators on the source countries. Specifically, the GDP per capita in PPPs and Gini coefficients for each country of origin are obtained from the World Bank database (2019). GDP per capita of Syria<sup>1</sup> is taken from the IMF database (2019), which is also represented in PPPs. Voice and Accountability and Rule of Law indicators are from the Economist Intelligence Unit (2019). Voice and Accountability is comprised of democracy index, vested interests, accountability of public officials, human rights, freedom of association, while Rule of Law – violent and organized crimes, fairness and speediness of juridical processes, intellectual rights and private property protection, enforceability of contracts and confiscation/expropriation. Data about the trade of goods with Sweden are the calculations of International Trade Center based on ITC (2019). Immigrant stock information is obtained from the Statistics Sweden (2019b). The indicators are assigned to each observation by taking the end year of the scholarship programme, assuming that students are making their final decision about immigration at the end of their studies.

The above-mentioned 6 indicators exist for all the countries included in the sample. However, there are missing values for some of the years of the first 4 indicators, which are filled in. Firstly, the GDP per capita and Gini coefficients are filled in by using the Fill in command on Excel, which complement the series by employing the linear trend approach. Assuming that economic indicators are not changing significantly in the short-term, this might not affect the data, since the values are missing only for a year or a few years. Voice & Accountability and Rule of Law Indices are missing for 4 countries – Georgia, Belarus, Sudan and Tajikistan – for the period between 2003 and 2005. Here the values of the closest years are taken, again assuming that in a 2-year period such Indices can hardly change considerably.

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<sup>1</sup> GDP per capita of Syria is available only for 2010. For the following years, the IMF estimations are taken.

<b>Variable Name</b>	<b>Description</b>	<b>Source</b>
Leave or stay in Sweden	Dichotomous variable describing whether a student stays in Sweden after graduation or returns to home country	Swedish Institute Alumni Survey
GDP per capita	GDP per capita in PPPs in home countries	World Bank, International Comparison Program database (2019); IMF Data Mapper (2019)
Gini Coefficient	Measures the income distribution in source countries	World Bank, World Development Indicators (2019);
Voice & Accountability	Measures the level of democracy and social freedom	Economist Intelligence Unit (2019)
Rule of Law	Measures the rule of law performance and rights protection	Economist Intelligence Unit (2019)
Imports to Sweden	Imports of goods from source countries to Sweden	ITC (2019)
Exports from Sweden	Exports of goods from Sweden to source countries	ITC (2019)
Immigrant Community	Number of the immigrants from each source country	Statistics Sweden (2019)
Duration of studies	Number of years of respondents in Sweden as a student	Swedish Institute Alumni Survey
Year of scholarship	Dummy variable (0 ended the programme before 2008, 1 after 2008)	Swedish Institute Alumni Survey
Age	Age of respondents at the end of the scholarship programme	Swedish Institute Alumni Survey
Gender	Dummy variable (0 male, 1 female)	Swedish Institute Alumni Survey
Visa	Dummy variable (0 if visa is needed for entering to Sweden, 1 if not)	Government Offices of Sweden (2019)

## Dependent Variable

The dependent variable in the model is *leave or stay in Sweden* after the end of the study period. The variable is created based on the responses of alumni to the question about their current country of residence. If they mentioned Sweden as a country of their current residence, then the variable takes the value of 1. If, instead, the home country is mentioned as a country of residence, the variable takes the value of 0. Hence, the dependent variable is included into the model as a dummy variable with the following values:

$$y = \begin{cases} 0 & \text{if returned home country after graduation} \\ 1 & \text{if stayed in Sweden after graduation} \end{cases}$$

In overall, 335 out of 1054 respondents included in the sample mentioned Sweden as their country of residence, which makes around 31.8% in the total. Almost 94% of staying graduates have an employment. They are either employees in Swedish organizations or entrepreneurs or PhD students and researchers.

## Independent Variables

For testing the 4 hypotheses, 7 independent variables are included in the model, out of which 2 represent economic indicators, 2 social indicators and the other 3 are measuring the links of graduate students' to Sweden.

### *Economic Indicators*

To see, whether the income levels and returns to skills in source countries are playing role in foreign students' immigration intentions 2 variables are used. Firstly, larger part of the respondents is coming from developing countries, where informal economy still has a large share (ILO, 2018). Taken this into consideration the *GDP per capita* in PPPs is used to measure the income level in the source countries. Secondly, since the relative returns to educations (i.e. real wages of highly-skilled individuals) for the entire dataset are not available, it is proxied by the

Gini coefficient. Brucker and Defoort (2009) following Groger and Hanson (2011), use only Gini coefficient as a measure of skill premium by assuming that wages are the main source of income and that education level is highly correlated with the Gini coefficient. The latter has been empirically shown by Groger and Hanson (2011).

### *Social Indicators*

The *Voice & Accountability*, *Rule of Law* indices calculated by Economist Intelligence Unit (2019) are used to measure the level of political and social freedom, human rights and intellectual rights protection, and rule of law performance in the source countries. *Rule of Law* is also accounting for factors, such as the political disturbances and conflicts in the source countries that might affect the students' immigration intentions. Brucker and Defoort (2009) use Democracy Index calculated by the EIU in their analysis for controlling the effect of political and social conditions in home and receiving countries. The indices used in this thesis consist of wider range of sub-indicators including the Democracy Index. Both are available for the period 2000-2018, whereas Democracy Index is calculated only for the post-2006 period.

### *Links with Sweden*

As a measure of transnational links, the bilateral trade and immigrant community size in Sweden are taken. The import and export flows of goods proxy the links between the organisations in Sweden and the source countries, whereas the immigrant community size is reflecting the links between the people of a given source country and Sweden.

### *Other Variables*

Control variables included in the model are mostly describing the characteristics of the individuals. Specifically, *age* is controlling for the experience, skill and education level of the respondents, whereas *gender* is included to control for the specificities related to the gender. The dummy for the *year of scholarship* is another important variable to take into account, since the changes in the labour immigration policy might have had its impact on the opportunities for international students' to find an employment in Sweden after their graduation. *Duration of studies* is the period of the scholarship programme that coincides with the years of the university programme and consequently years of living in Sweden. It might also affect the students'

immigration intentions as well as opportunities. Indeed, longer period of stay in Sweden increases the chances of settling better in the destination country and establishing stronger networks. *Visa* requirement is yet another factor that might affect the opportunities of finding an employment for students coming from countries for which visa is required for short-term stay (Grogger & Hanson, 2015).

## Methods

The hypotheses of this thesis are about revealing how the socioeconomic conditions in their country of origin are influencing the probability of staying in Sweden after graduation. Therefore, the dependent variable represents a dichotomous choice for graduate students – either leave or stay in Sweden after finishing their studies.

Given the binary response of the dependent variable, the study uses probit regression model for the analysis. The probit model is a type of probability model, which means that it aims at finding the probability of dependent variable taking the value 0 and 1 (Gujarati, 2009). Given the hypotheses of this study, the objective of the model is to find the probability of leaving Sweden for the home country or staying there after graduation dependent on a range of independent variables. The regression model will take the following form:

$$Pr(Y = 1|Xi) = \varphi(\beta_1x_1 + \beta_2x_2 + \beta_3x_3 + \beta_4x_4 + \beta_5x_5 + \beta_6x_6 + X\beta)$$

Where  $Y$  is the dependent value and  $\varphi$  is the cumulative distribution function of a standard normal distribution. The independent variables  $x_1, x_2, x_3, x_4, x_5,$  and  $x_6$  represent GDP per capita, Gini coefficient, Voice & Accountability Index, Rule of Law Index, bilateral trade and immigrant community size in the country of residence after graduation, respectively. In addition,  $X$  represents the vector of control variables, which include the age, gender, years of study period in Sweden, a dummy for the year of receiving scholarship (0, if before 2008, and 1, if after 2008), and a dummy for visa requirement.

For interpretation purposes, the results of the model estimation are presented in marginal effects. Marginal effects show the change in probability that the dependent variable will take the value 1



when the independent variable increases by 1 unit (Torres-Reyna, 2014). In other words, the obtained results will show the estimated magnitude of the impact that the independent variables of the model have on the probability of foreign students' immigration to Sweden after graduation, holding constant the other predictors. The marginal effects are presented at the means, which means that they are calculating by taking the arithmetic means as the values of independent variables (Torres-Reyna, 2014).

For avoiding the risk of outliers some of the independent variables, namely the GDP per capita, export and import levels and immigrant community size are included in the model in a logarithmic form. This transformation is conducted given their dispersed nature. For interpretation purposes, the variables are transformed to log values with a base of 2. It allows getting the effect of the two-fold increase in the independent variable on the probability that the dependent variable will take value 1.

# 5. Results

## Descriptive Statistics

The objective of this thesis is to investigate the socioeconomic determinants of the choice of country among foreign students after their studies in Sweden. Before proceeding to the results of the regression model, some descriptive statistics are presented in order to give an overview about the relationships among the variables of interest.

The individuals included in the models are mostly from low and middle income countries. Table 1 presents the number of graduates for years 2005, 2010 and 2015 grouped by the income level of source countries in accordance to the World Bank classification. In 2005, there were only 25 graduating students in the sample, out of which 16% were from high income countries. However, over the years the picture is changing, becoming 4% and 6% in 2010 and 2015, respectively. The reason is that most of the scholarship programmes of the Swedish Institute are targeting students from developing countries and since 2012 one of the requirements is to be a “tuition-fee-paying” student (Swedish Institute, 2019a). Therefore, in order to obtain trustworthy results, in the next section, the regressions are run also by excluding the EU/EEA countries, the USA and Canada.

**Table 1: Number of graduates in the sample from per country group**

<b>Countries</b>	<b>2005</b>	<b>2010</b>	<b>2015</b>
Low Income	5	10	35
Low Middle Income	9	24	74
Upper Middle Income	7	17	50
High Income	4	2	10
<i>Total</i>	25	53	169

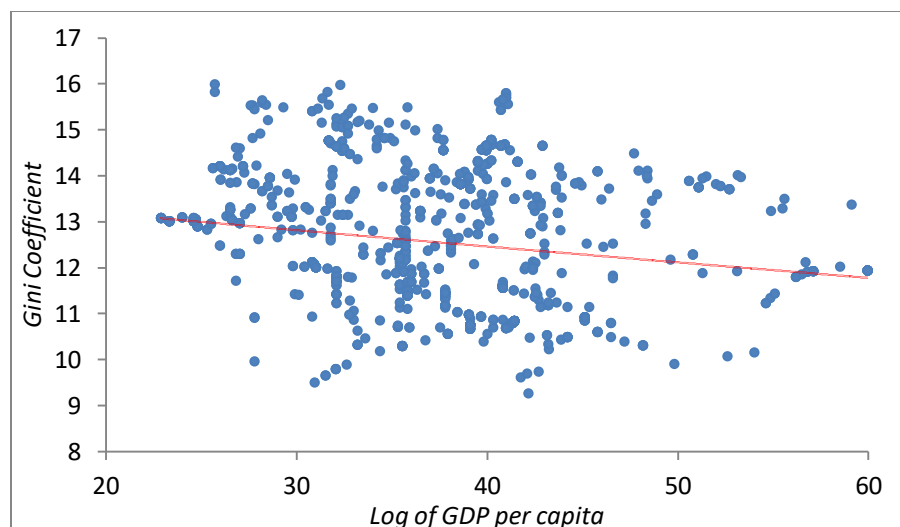
Note: According to World Bank Analytical Classifications

Table 2 below presents the summary statistics for the log of *GDP per capita* of alumni’s country of origin. As it can be seen, both groups of students are coming from countries with a mean value of logged *GDP per capita* around 12. However, the median of this variable tells more about its effect on the final outcome. Most of the students that left Sweden after graduation are coming from countries with log of *GDP per capita* near to 12.47, which is lower compared to the log of

*GDP per capita* corresponding to the group of staying students. Interestingly, the level of inequality is higher for countries of the sample with lower level of *GDP per capita*, and is decreasing with it (see Figure 3). These 2 findings together might be an indicator of Roy model assumptions, which means that students are returning to their home countries with lower income level, but higher inequality for exploiting their skill premium by positioning at the upper end of the income distribution. The summary statistics for *Gini coefficient* presented in Table 2 also shows that students who left Sweden after studies are going back to countries with higher inequality.

**Table 2: Summary statistics of GDP per capita and Gini coefficient for each group of students**

	<b>Mean</b>	<b>Std. Dev</b>	<b>Frequency</b>	<b>Median</b>
<i>Summary of log of GDP per capita</i>				
<i>Left</i>	12.608	1.464	719	12.47
<i>Stayed in Sweden</i>	12.671	1.385	335	12.82
Total Students	12.628	1.439	1054	
<i>Summary of Gini coefficient</i>				
<i>Left</i>	38.01	7.99	719	37.8
<i>Stayed in Sweden</i>	36.63	7.38	335	35.3
Total Students	37.57	7.83	1054	



**Figure 3: Relationship between log of GDP per capita and Gini Coefficient in source countries**

The summary statistics indicate that the social indicators in countries of origin are also differing depending on the group of students. Staying students are those that are coming from countries with lower levels of *Voice & Accountability* and *Rule of Law*, which could be expected. Table 3 shows that the mean and median values for both indices are lower for countries from where students immigrated to Sweden after the end of their study programme.

**Table 3: Summary statistics of Voice & Accountability and Rule of Law Indices**

	Mean	Std. Dev	Frequency	Median
Summary of Voice & Accountability Index				
<i>Left</i>	0.452	0.169	719	0.44
<i>Stayed in Sweden</i>	0.389	0.172	335	0.41
<i>Total</i>	0.432	0.172	1054	
Summary of Rule of Law Index				
<i>Left</i>	0.431	0.173	719	0.44
<i>Stayed in Sweden</i>	0.373	0.187	335	0.38
<i>Total</i>	0.413	0.18	1054	

A strong relationship exists also between the log of *immigrant community size* in Sweden and the likelihood of students' permanent immigration after graduation. The figure in the Table 4 shows that the log of *immigrant community size* to which the staying students belong are almost twice larger compared to the ones the leaving students belong to. Such a pattern provides ground to

believe that the social networks are an important factor in the migration decision of international students.

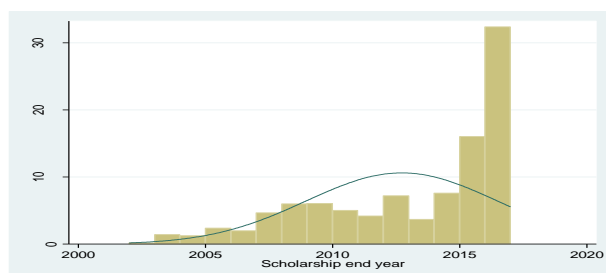
**Table 4: Summary statistics of Immigrant Community Size for each group of students**

	<b>Mean</b>	<b>Std. Dev</b>	<b>Frequency</b>	<b>Median</b>
<i>Left</i>	0.964	2.172	719	0.840
<i>Stayed in Sweden</i>	1.749	2.236	335	1.792
<b>Total</b>	1.213	2.222	1054	

In addition, Table 5 represents the potential relationship between some individual characteristics and students' immigration decision. Taken the possible effect of these factors, they are included into the model as control variables. In particular, although it was expected that the difference between men and women might be more significant, since female students are more likely to be attached to their home countries, and therefore return back, the proportions of females among the staying students is still smaller than that of males, 55.5% and 44.5%, respectively. Furthermore, the number of years of stay in Sweden for study purposes also seems to play a role. Only 25% of students studying 1 year at a Swedish university, stayed after graduation, while this figure reaches to 43% for students doing 2-year programme. This pattern might be the consequence of having more time for establishing social networks. The year of starting the studies also makes a difference in terms of their migration status after graduation. Before the labour migration policy changes in 2008, only 26.3% of foreign students stayed in Sweden, whereas after 2008 their number increased, reaching to 33.6%. Nevertheless, it should be taken into account that only around 20% of students included in the sample graduated before 2008. As it can be seen in Figure 4, most of the respondents have graduated after 2015, which, however, might not affect the estimation results.

**Table 5: Summary Statistics of Control Variables**

	Left	Stayed
Gender		
<i>Male</i>	57.74	55.52
<i>Female</i>	42.26	44.48
Duration of studies		
<i>1 year</i>	74.61	25.39
<i>2 year</i>	57.32	42.68
Year of scholarship		
<i>Before 2008</i>	73.68	26.32
<i>After 2008</i>	66.37	33.63

**Figure 4: Distribution of students' graduation years**

## Regression Results

The hypotheses of the thesis are tested by using a single probit model, which includes the possible socio-economic determinants of international students' post-graduation migration decisions. The results are presented in marginal effects. For interpreting the magnitude of each coefficient, the average marginal effects at means are obtained. The regressions are run with using robust standard errors, which allows dealing with the issue of heteroskedasticity in the data. To avoid the issue related to multicollinearity among the variables, only *exports from Sweden* are included into the model, since there is collinearity between the latter and *imports to Sweden* (see VIFs in the Appendix 2). The regression results are presented in Table 6. In overall,

the results show that the social factors, in particular the level of *Voice and Accountability* and *Rule of Law*, as well as the established social networks are significant determinants in choosing Sweden as a place of long-term residency among foreign students. Furthermore, the income level and inequality does not have any statistically significant impact on the students' immigration intentions. This can be seen as evidence that Roy model predictions might not work in the case of international students.

As the economic determinants – log of *GDP per capita* and *Gini coefficients* – are used in the model. Although it was expected that the income level and inequality in the home country might be important factors, the model shows that they are statistically non-significant. The results for both log of *GDP per capita* and *Gini coefficient* hold true even if the model is run by excluding students from the EU/EEA member countries, the US and Canada. Thus, the  $H_{1A}$  and  $H_{1B}$  hypotheses are not rejected.

The social indicators, specifically the *Voice & Accountability* and *Rule of Law* in the home countries of foreign students are expected to have negative effect on the probability of immigrating to Sweden. The regression results confirm that *Voice & Accountability* and *Rule of Law* have statistically significant negative effect at 1% and 10% significance levels, respectively, on the probability that students will stay in Sweden after graduation. The marginal effects show that 1 point increase of *Voice & Accountability* Index in source countries decreases the probability that students will stay in Sweden by 43.8 percentage points. Similarly, 1 point increase of *Rule of Law* index in the home country decreases the probability that the student will stay in Sweden by 22.3 percentage points. The marginal effects of these variables become even larger after the exclusion of high income countries from the model. Therefore, the  $H_2$  hypothesis is rejected.

In the end, among the measures of links established with Sweden, the impact of communities on the likelihood of students' immigration after studies is statistically significant at 99% confidence interval. The two-fold increase in the immigrant community size increases the probability of student's immigration after graduation by 4.48 percentage points. The impact of immigrant community size on the probability of students' settlement in Sweden becomes larger (4.6

**Table 6: Probit regression results**

<b>VARIABLES</b>		
<i>Economic Factors</i>		
Log of GDP per capita	0.0268 (0.0170)	0.0252 (0.0177)
Gini coefficient	0.00150 (0.00217)	0.00167 (0.00228)
<i>Social Factors</i>		
Voice & Accountability	-0.335*** (0.124)	-0.346*** (0.134)
Rule of Law	-0.223* (0.127)	-0.351** (0.145)
<i>Links with Sweden</i>		
Log of Exports from Sweden	-0.0178** (0.00821)	-0.0184** (0.00849)
Log Immigrant Community Size	0.0448*** (0.00947)	0.0464*** (0.0103)
<i>Control Variables</i>		
Duration of studies	0.0888*** (0.0292)	0.0981*** (0.0306)
Age	-0.0235*** (0.00356)	-0.0240*** (0.00395)
Gender	0.0127 (0.0307)	0.0115 (0.0330)
Before/After 2008	-0.0259 (0.0395)	0.00652 (0.0415)
Visa requirement	0.0232 (0.0481)	0.00856 (0.0518)
<i>High income countries excluded</i>		
Observations	1,043	942

Standard errors in parentheses: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$



percentage points) if high income countries are excluded from the model. Furthermore, the level of trade in goods has statistically significant effect on the probability of staying in Sweden at 95% confidence interval. The marginal effect of the log of *exports from Sweden* shows that the two-fold increase in the export level from Sweden to the source country decreases the probability of students' stay in Sweden by 1.7 percentage points. The effect changes slightly when the model is run only for low and middle income countries. Given, this the H3 hypothesis about the zero effect from the links with Sweden is rejected

For the purpose of conducting a sensitivity check, a linear probability model is run in addition to the probit model. The estimates of the model are presented in the Appendix 3. The comparison of the results shows that there is no remarkable difference between the models. The further comparison of the marginal effects in probit model and the OLS estimates shows no significant difference. One difference that is worth noting is that the coefficient of the log of *GDP per capita* is statistically significant, but only at 10% significance level.

The results of the analysis will be discussed in details in the next section. Some possible explanations will be provided for the findings. The discussion of the results will be followed by the presentation of the study limitations.

## 6. Discussions

The migration decision among immigrants is conditioned by number of observable and unobserved factors (Borjas, 1987). The factors may range from socio-demographic characteristics of the individuals, the economic and political situation in their home countries to their personal experiences and perceptions. Despite the large number of influencing factors, the empirical literature have showed that some of them, namely economic and social determinants, as well as the established links between the source and destination countries are playing a key role in the immigration intentions of people. This thesis aimed at revealing whether those factors have similar importance among international students as well, which represents a special subgroup of highly-skilled immigrants.

According to the probit model estimations, the *Gini coefficient* measuring the income inequality and log of *GDP per capita* measuring income level in the home countries of foreign students have no statistically significant impact on the probability of students' immigration after graduation. Despite the non-significant results, the marginal effects are worth taking a look at. Contrary to the expectations and the predictions made through the descriptive analysis, the *Gini coefficient* has a positive sign, indicating that the increase in inequality in the home country increases the probability of staying in Sweden after graduation. It indicates that the Roy model assumptions may not hold true for international students; students do not prefer to return to their home countries, if the income inequality is high there, as other highly-skilled individuals do in order to exploit their skill premium. Anyhow, the variable is not statistically significant. The reason of the insignificant result might be that the individuals included in the sample do not have high enough skill level. Given that the 50% of the respondents are below 29 years, this might be the case. The effect of logged *GDP per capita* in source countries is also statistically insignificant. Such non-significant effect might be caused by the fact that the destination country is Sweden that has higher compensation rates, compared to the source countries included in the sample. Therefore, according to the model estimates, the economic factors are not important determinants in foreign students' post-graduation immigration intentions.

Instead, the level of social and political freedom has a significant impact on the students' immigration decisions. In particular, the *Voice and Accountability* Index which is composed of democracy, vested interests, accountability of public officials, human rights and freedom of association indices (EIU, 2019), is statistically significant at 1% significance level. The marginal effect of the variable shows that 1 unit increase of the source country Index decreases the probability that the student will stay in Sweden after graduation by 43.8 percentage points. The picture does not change significantly after excluding the students from high-income countries. This finding is in line with the results of Brucker and Defoort (2009), which included the Democracy Index in their analysis and found that source countries with higher level of political freedom have lower skilled emigration. Similar significant effect has the *Rule of Law* Index in home countries, which becomes even larger after excluding the high income countries from the analysis. 1 unit increase in the *Rule of Law* Index increases the probability that the students will remain in Sweden after graduation by 22.3 percentage points for all the countries of the sample, and by 35.1 percentage points for low and middle income country students. Thus, the results confirm the expectations that students are giving significant importance to the political and social environment when it comes to choosing a country of residence. In this sense, it might be argued that the international students behave similar to other types of highly-skilled immigrants.

Another interesting finding is the significant role of immigrant communities in Sweden on the location choice of graduate students. The marginal effect of log of *immigrant community size* is statistically significant for models with and without high income countries. It indicates that belonging to larger communities increases the probability of staying in the destination country after graduation. The academic literature on the role of immigrant communities shows that the communities are important factor in the immigration process. However, some studies show that this is not the case of highly-skilled individuals (i.e. McKenzie and Rapoport, 2010). Nevertheless, the findings of this thesis show the opposite by revealing that communities are important determinants of students' immigration after graduation. It should be stressed that this might be the consequence of the characteristics of Swedish labour market, in which one of the most efficient job finding mechanisms is the use of networks (OECD, 2016).

The links between Sweden and the source countries measured by the log of *Exports from Sweden* also has statistically significant impact at 5% significance level. However, according to the

marginal effect estimations, the impact might not be economically significant. Specifically, the two-fold increase of the export levels from Sweden to the source country decreases the probability that the student will stay in Sweden after graduation by only 1.7 percentage points. Despite the magnitude of the impact, there is negative relationship between the variables, which can have various reasons. One of the causes might be that increasing trade between the 2 countries, which consequently results in stronger collaborations between the Swedish and source country organizations, increases the demand for individuals lived and studied in Sweden. This can be one of the possible explanations of the negative effect from the exports level on the dependent variable, which needs to be studied in the future research.

## 7. Research Limitations

The analysis of the study has number of limitations that one might take into consideration before drawing conclusions based on the study findings. The issues are related to both the data and the model specification used for the analysis.

Firstly, the survey data used in the model is not representative for all the foreign students who obtained their university degrees in Sweden. Indeed, the students of the sample are selected in accordance to the requirements of the Swedish Institute, which include the “intellectual ability and leadership potential” of the applicants (Swedish Institute, 2019a). It is possible that such students’ decisions about the choice of location are driven by different motivations compared to other groups of foreign students. Moreover, the survey may not be representative for all the Swedish Institute scholarship holders as well, given that not all the alumni responded to the survey. In addition, large number of observations were dropped, which might create a bias in the model estimates, although it was considered before deleting the observations. In addition, the proxies used for the source country characteristics may be criticized. For instance, Belot and Hatton (2012) argue against the use of Gini coefficient as a proxy of return to skills, because according to them, it measures the income level for all education groups. Instead, they use the ratio of the wage level for occupations requiring high skill level to wage level of occupations requiring low skill level. Unfortunately, because of the unavailability of the wage level data for all the source countries and time periods included in the sample, the Gini coefficient is used in this thesis.

Secondly, the empirical specification may also pose a problem for the estimates. As the literature review showed there is a range of personal characteristics that play a role in the decision-making process of an individual. For instance, the field of study, previous experience, university and region, personal relationships, perceptions about the future and other unobserved factors are not controlled in the model, which might bias the estimates. Furthermore, there might be an issue of reverse causality between the variables of the model. For example, it can be the case that the decrease in the probability of students’ stay in Sweden after graduation leads to the increase in exports from Sweden to the respective source country, but not the reverse. The findings of Murat

(2014) might support this argument, which find that the network of foreign students established in the UK during their studies has an impact on the trade levels with the source countries.

## 8. Conclusion

Globalization and the need of sustaining the innovation performance resulted in a “race for talent” among the countries of the world. The reason is that the highly-skilled immigrants are representing a huge pool of talent for the countries, which aim at filling in the gap in their labour market and attracting the brightest minds of the world. It is well-documented in the academic literature that high-skilled immigrants have positive impact on the innovation level of the immigrant-receiving countries. Taken this into consideration, a large strand of literature started examining the determinants of immigration intentions among highly-skilled individuals. However, little attention has been paid to the factors influencing the decision on immigration among the international students after the graduation in the country of their studies (Bijwaard & Wang, 2016). Given that international students are representing a special sub-group of high-skilled immigrants, this thesis has a purpose of filling in the existing gap in the literature. In particular, it aims at testing whether economic and social factors in the source countries, as well as the established links with Sweden are playing a significant role in students’

The study is focused on the international students doing their Master or PhD level studies at the Swedish higher education institutions. For conducting the analysis the alumni survey data of the Swedish Institute scholarship programmes is used. The scholarship programmes have the purpose of accelerating the international student mobility, as well as establishing long-term relationships between Sweden and the source countries (Swedish Institute, 2019a). The alumni survey data is complemented with information about the home country characteristics of the students. Taken into account the binary response of the dependent variable, which is *return* or *stay* in Sweden after graduation, a probit regression model is used for conducting the analysis.

The model estimates show that the economic factors, namely income level and inequality, are not playing a significant role in the probability that the students will settle in Sweden after their graduation. This is an interesting finding, since it is opposed to most of the finding in the literature, according to which economic factors are important determinants for high-skilled immigrants. At the same time, the social indicators, which are the *Voice & Accountability* and *Rule of Law* Indices, have highly significant negative impact on the probability of students’ stay

in Sweden after graduation. These results are in line with other findings in the empirical literature about the determinants of immigration. Another finding of this thesis is that the links between Sweden and source countries, measured by the level of trade in goods and immigrant community size in Sweden, have, respectively, negative and positive marginal effects on the probability of students' stay in Sweden after graduation. It should be noted, however, that the findings of the thesis are subject to some limitations related to the representativeness of the data and the empirical specification, and should be used cautiously.

In overall, the contribution of this thesis is three-fold. Firstly, it focuses on a special sub-group of high-skilled immigrants, which are expected to have less obligations, more freedom and opportunities to settle in the country of their studies. Secondly, most of the research on the determinants of international students' immigration decisions is qualitative in nature, mainly based on interview analysis. This thesis provides quantitative analysis based on a survey data. Finally, the data used for the research is recent, which has never been used before for a similar study.

Further research on the international students' migration intentions may give broader understanding about the phenomenon and the specialty of this sub-group of high-skilled immigrants. In particular, better quality can be used by controlling for wider range of influencing factors. In addition, the analysis based on at least several destination countries might give more persistent results and provide ground for the generalization of the finding.



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# Appendice

## Appendix 1

Citizenship	2006	2012	2018
<b>EUROPE of which</b>	<b>778</b>	<b>1,056</b>	<b>887</b>
Russia	203	274	300
Turkey	237	471	466
<b>AFRICA of which</b>	<b>817</b>	<b>590</b>	<b>1,207</b>
Egypt	60	45	158
Ethiopia	26	107	178
Cameroon	104	22	107
Nigeria	297	60	218
<b>AMERICA of which</b>	<b>999</b>	<b>1,495</b>	<b>1,882</b>
Brazil	66	141	250
Canada	219	386	397
Mexico	159	173	280
USA	312	536	953
<b>ASIA of which</b>	<b>4,371</b>	<b>4,673</b>	<b>9,755</b>
Bangladesh	259	132	1,029
India	482	402	1,858
Iran	349	462	937
Japan	164	252	308
China	1,378	1,732	2,201
Pakistan	907	338	1,039
<b>OCEANIA</b>	<b>350</b>	<b>404</b>	<b>353</b>
<b>OTHERS</b>	<b>16</b>	<b>13</b>	<b>20</b>

Residence permits granted to students

Note: PhD students are included as of and incl. 2012

Source: Migrationsverket (2019)

## Appendix 2

Results of the VIF command in Stata

<b>Variable</b>	<b>VIF</b>	<b>1/VIF</b>
GDP per capita	2.86	0.349752
Gini Coefficient	1.28	0.780580
Voice & Accountability	2.21	0.453340
Rule of Law	2.34	0.428171
Imports to Sweden	5.25	0.190323
Exports from Sweden	4.25	0.235466
Size of Immigrant Community	2.21	0.453226
Duration of studies	1.20	0.836431
After 2008	1.10	0.916829
Gender	1.09	0.916829
Age	1.25	0.802468
Visa	1.84	0.543381

Appendix 3

**Linear probability model estimates**

<b>VARIABLES</b>		
<b>Economic Factors</b>		
Log of GDP per capita	0.0298* (0.0160)	0.0276* (0.0163)
Gini coefficient	0.00129 (0.00193)	0.00139 (0.00196)
<b>Social Factors</b>		
Voice & Accountability	-0.322*** (0.114)	-0.323*** (0.121)
Rule of Law	-0.211* (0.115)	-0.312** (0.124)
<b>Links with Sweden</b>		
Log of Exports from Sweden	-0.0176** (0.00758)	-0.0177** (0.00758)
Log of Immigrant Community Size	0.0414*** (0.00808)	0.0418*** (0.00856)
<b>Control Variables</b>		
Duration of studies	0.0813*** (0.0296)	0.0872*** (0.0307)
Age	-0.0176*** (0.00213)	-0.0177*** (0.00231)
Gender	0.00993 (0.0284)	0.0102 (0.0303)
After 2008	-0.0321 (0.0347)	-0.00515 (0.0362)
Visa requirement	0.0122 (0.0450)	-0.00247 (0.0473)
Constant	0.634*** (0.214)	0.667*** (0.222)
Observations	1,043	942
R-squared	0.133	0.142

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1