Lists and Learners

The Importance of University Rankings in International Graduate Student Choice

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Abstract

This thesis examines the relationship between two rapidly increasing aspects of the world's higher education landscape: international student mobility and League Tables and Ranking Systems (LTRS) which evaluate higher education institutions (HEIs). This study utilized results from two recent large-scale student surveys which included over 5000 domestic and international graduate students at 82 HEIs in 19 European Union/European Free Trade Area (EU/EFTA) countries. Two primary areas of differences among respondents were analyzed:

1. Comparisons of the differing levels of importance domestic and international graduate students placed on rankings and other factors in their choice of a HEI.
2. Differences in the importance of rankings among different international graduate student demographic groups (age, country of study, discipline, gender, level of degree program, nationality, region of origin, home country income level).

In order to put the quantitative findings from this thesis into context, three background areas are presented. The first provides a conceptual background to international student mobility, by introducing relevant aspects of globalization and internationalization, rationales behind cross-border education, and the scope of student mobility worldwide and in the EU/EFTA region. The second area examines the rise of national and global LTRS. Lastly, prominent theoretical models created to understand domestic and international student decision-making, as well as the results from a comprehensive review of previous student choice studies are discussed.

Among the major findings is that in 31 of 36 comparisons, international and domestic graduate students varied significantly in the importance placed on the included choice factors. In regards to LTRS, master and doctoral students from outside the EU/EFTA rated rankings as significantly more important than domestic students in both surveys. International students from the EU/EFTA only rated rankings higher than domestic students in the 2009 survey.

The 2007 survey included biology, chemistry, math, and physics graduate students. Degree level and country of study were significant factors associated with the importance placed on rankings among both international students from the EU/EFTA region, and those from outside the region. Students from outside the region also placed significantly greater importance on rankings than the EU/EFTA international students. Comparisons combining those two groups showed significant differences based on nationality, region of origin, and home country income level. Age, gender and discipline did not play a significant role within either group.

In the 2009 survey, including economics, political science, and psychology, few significant differences were found in the importance of rankings between or among international students from the EU/EFTA region and those from other countries. While country of study was a significant factor within both groups, discipline was a significant factor only for EU/EFTA students. There was also a small negative correlation with age and the importance placed on rankings by international EU/EFTA doctoral students. Home country income level was a significant factor among the combined group of international students. However, degree level, gender, nationality, and region of origin were not significant for either international group.

Multivariate analyses conducted using binary logistic regression were generally consistent with the bivariate analyses presented above for the 2007 and 2009 samples. The major exceptions were that home country income level and country of study were no longer significant predictors of the importance placed on rankings for international students in 2009.

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List of Acronyms Used

ACA	Academic Cooperation Association
CHE	Centre for Higher Education Development
CHERPA	Consortium for Higher Education and Research Performance Assessment
EC	European Commission
EHEA	European Higher Education Area
EU/EFTA	European Union / European Free Trade Area
FE	Fisher's Exact Test
HEFCE	Higher Education Funding Council for England
HEI	Higher Education Institution
IGS	International Graduate Students
IMF	International Monetary Fund
KW	Kruskal-Wallis H Test
LTRS	League Tables and Ranking Systems
MW	Mann-Whitney U Test
OECD	Organisation for Economic Co-operation and Development
SJTU	Shanghai Jiaotong University
THE-QS	Times Higher Education - QS World University Rankings
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNESCO-UIS	UNESCO Institute for Statistics
USNWR	US News and World Report

Chapter 1: Introduction

1.1 Background and Context of the Study

Fostered by globalization and rise of the knowledge economy, the 21st century has brought an increasingly competitive environment to higher education. Higher education institutions (HEIs) and nations now compete nationally and internationally for prestige, funding, top professors, rankings, and international students (Altbach, Reisberg and Rumbley, 2009; Marginson and van der Wende, 2007b). Paralleling this more competitive atmosphere are the creation of national and global League Tables and Ranking Systems (LTRS[1]) designed to evaluate HEIs and increases in cross-border student mobility (van der Wende, 2008). That mobility is the most visible aspect of national and HEI internationalization strategies taking place in response to, and in some cases to capitalize on, globalization (Knight, 2007). International student mobility has increased nearly 4-fold since 1975, to an estimated three million students in 2007 (OECD, 2009). This growth is expected to continue, and one forecast sees the number reaching 5.8 million international students by 2020 (Böhm et al., 2004).

International student mobility has become a significant policy goal in the European Union and European Free Trade Area (EU/EFTA) (Rivza and Teichler, 2007). This goal has contributed to ongoing national and European level reforms taking place in the Bologna Process and Lisbon Strategy. Among the goals in those initiatives is to increase the competitiveness of European higher education systems, and individual HEIs in the global market for international students (van der Wende and Middlehurst, 2004). The number of international students in the EU/EFTA region has increased nearly 50% since 1999, suggesting those reforms are having an effect. The EU/EFTA region attracted over 1.2 million international students in 2007 (UNESCO-UIS, 2009). This represented 44% of the world's total, and the EU/EFTA region is now clearly the dominant area in attracting international students. While most of those students came from developing nations, one third came from within the EU/EFTA region.

With the introduction of national level LTRS in many countries in the past decade, rankings have become a key aspect of many higher education discourses throughout the world (Salmi and Saroyan, 2007). The influence of LTRS rose greatly with the creation of two prominent global LTRS: the *Academic Ranking of World Universities* by Shanghai Jiaotong University in 2003 and the *Times Higher Education - QS World University Rankings* by the *Times*

[1] The LTRS acronym is adopted from (Hazelkorn, 2007) and will be used for readability throughout this thesis.

Higher Education Supplement in 2004. Those global LTRS intensified competition in higher education worldwide and have quickly "become a barometer of global competition measuring the knowledge-producing and talent-catching capacity of higher education institutions (Hazelkorn, 2009, pg. 47)." King argues that global LTRS are "significant market participants almost irrespective of the scientific validity of their approaches (2009, pg. 212)." LTRS have also been subject to substantial criticism and are a common area of study and commentary for higher education experts, many of whom question the validity and methodologies adopted.

Early research also indicates that LTRS may be having substantial impacts at both national and institutional levels. As an example, the perceived poor standing of Continental European HEIs in global LTRS has resulted in policy debates surrounding the issue of 'lagging behind.' Results of those debates are still being determined, but developments have begun to emerge. This includes plans in Denmark, Finland, France and the Netherlands to merge HEIs (Marginson and van der Wende, 2007b; Salmi and Saroyan, 2007; Siganos, 2008) and the use of more concentrated governmental funding in France and Germany to create 'centers of excellence' at particular HEIs (King, 2009). Both developments are seen as ways to improve the standing of HEIs in global LTRS which often favor larger research-intensive institutions (Marginson, 2009). In many European contexts, these developments represent a shift from the traditional egalitarian HEI funding that has long been a feature of their systems.

LTRS results are also closely watched by leadership at individual HEIs. While research of the influence of LTRS at institutional levels has been limited, early studies found indications of substantial impacts on behavior and decision-making (Hazelkorn, 2007; 2009; HEFCE, 2008; IHEP, 2009). In those studies, half of responding HEIs had taken strategic action in response to LTRS. This included curriculum changes, reallocation of funding and resources towards research, and increased numbers of graduate programs and scholarly publication in English.

At least partially responsible for the changes being fostered by national and global LTRS is a common perception that ranking results are taken seriously by many stakeholders, notably by students in choosing a HEI. Early research in some countries has confirmed this belief among senior academics and administrators (Hazelkorn, 2007; 2009; HEFCE, 2008; IHEP, 2009; Rolfe, 2003; Sauder and Lancaster, 2006). Many respondents in those studies also indicated a belief that LTRS are more important to the decision-making of certain populations, including graduate and international students. This notion that LTRS are influential in student choice is demonstrated by the fact that, despite concerns over the validity of many LTRS, numerous

HEIs use their relative standing in marketing materials, particularly those intended for international students (Hazelkorn, 2007; HEFCE, 2008; Salmi and Saroyan, 2007).

1.2 Rationale for Study and Statement of Research Problem and Questions

Much of the impetus behind the creation of many LTRS was to meet public demands for greater information and transparency about HEIs, which governments and HEIs themselves have not been able or willing to provide (Usher and Savino, 2006). Accordingly, most LTRS are national in scope, and produced by or in partnership with media companies, to provide students and parents with information to help them choose a HEI (Dill, 2007; Salmi and Saroyan, 2007). While LTRS are continuingly introduced in more countries, little research has taken place on the actual impact of LTRS in student decision-making. Few empirical studies have taken place, and much of the existing evidence is anecdotal (Clarke, 2007). Most studies conducted have focused on the influence of LTRS to domestic undergraduate students within single national contexts, notably in Germany, the UK and the US, where LTRS are well-established. The results of studies undertaken are inconclusive. Some have shown LTRS to be important factors in student choice, while others have shown LTRS are less important.

While research into the role of LTRS in domestic undergraduate student choice is still minimal, it has grown in recent years and a knowledge base is beginning to be established. However, as was evident from the extensive literature review carried out for this thesis, away from domestic undergraduate student contexts, much less research has been conducted. In particular, there is minimal evidence to support claims that LTRS are more influential to international and graduate students. Very few studies have been undertaken in graduate student contexts, domestic or international, and only two small-scale studies were found that specifically examined the influence of LTRS in international graduate student choice.

LTRS and international student mobility are both highly visible, yet very under-researched areas of higher education. Consequently, the goal of this thesis was to add to the small body of knowledge regarding the influence of LTRS on student choice. In particular this thesis focused on the area that has received the least research attention to date, namely international graduate students. With that focus in mind, the overall research problem for this study was:

> **How are league tables and ranking systems influencing the selection of higher education institutions by international graduate students?**

That research problem was operationalized through the following research questions:

1. Does the importance of LTRS and other student choice factors vary between domestic and international graduate students?
    a. How does the importance of LTRS compare to other student choice factors?

2. Are LTRS more important to different demographic groups of international graduate students?
    a. Degree Level (master and doctoral)
    b. Age
    c. Gender
    d. Academic Discipline
    e. Country of Study
    f. Country/Region of Origin

Those questions were addressed through a large-scale multi-national and multi-institutional quantitative study. Analysis was conducted into responses to demographic and student choice questions in the extensive graduate student surveys that took place during the 2007 and 2009 cycles of the *CHE ExcellenceRanking*[2]. The data analyzed included over 5000 domestic and international graduate students studying at 82 HEIs in 19 countries in the EU/EFTA region.

With the number of both LTRS and international students expected to expand significantly in coming years, it is important to understand the relationship between LTRS and international student decision-making. The research presented in this thesis adds to that understanding, and contributes to filling the existing research gap in the role LTRS play in international graduate student choice. In some cases, answers to these research questions provide the first evidence of the role LTRS play in specific aspects of international graduate student decision-making.

1.3 Overview of Thesis

This thesis has three primary goals. The first goal is provide a comprehensive overview of what is currently known about the choice of HEIs by international graduate students, with a particular focus on the role of LTRS in that decision-making process. The second goal is to add to that small knowledge base through presentation of new information gained from this quantitative study into international graduate student choice. That choice takes place in the context of policies and internationalization initiatives created at supra-national, national and institutional levels to foster international student mobility. Thus the third goal is to examine

[2] Results and detailed methodology of the project are available at http://www.excellenceranking.org/.

that context in detail. The next four chapters each address one of four primary questions that guided the conceptual and theoretical background investigations conducted for this thesis.

> *Question A. What are the national and institutional rationales for engaging in internationalization activities, including international student recruitment, and what is the current worldwide and European scope of international student mobility?*

Chapter 2 explores the concepts of globalization and internationalization with a focus on the EU/EFTA region. An introduction to cross-border education and international student mobility are also presented, including the worldwide and EU/EFTA scopes of that mobility.

> *Question B. How have LTRS come to play such an important role in higher education and what impact are they having in a European context?*

Since LTRS are the primary dependent variable examined is this thesis, Chapter 3 provides a conceptual background to the rise of national and global LTRS, as well as the methodological shortcomings inherent in many LTRS. The impacts LTRS are having at institutional, national, and supra-national levels are also presented, focusing on responses in the EU/EFTA region.

> *Question C. What is known about student choice from a theoretical perspective?*

Chapter 4 introduces theories developed to understand the complex student decision-making process. Prominent models developed in domestic undergraduate contexts are presented, as well as more recent international student choice models.

> *Question D. What research has been conducted into international graduate student decision-making, and in particular the role of LTRS in that process?*

Chapter 5 presents findings from a comprehensive literature review. As minimal research was found into international graduate student decision-making, particularly the role of LTRS in that process, international undergraduate and domestic student studies were also examined.

The remainder of this thesis is dedicated to new knowledge from this project's findings. Chapter 6 explains the project's methodology and the quantitative analysis techniques used in this thesis. Chapter 7 presents results of the analyses conducted and relates the findings to previous research. Chapter 8 summarizes the major findings from the data analysis chapter, discusses the limitations to this study and provides some suggestions for future research.

Chapter 2: Contextual Background: Globalization, Internationalization, and International Student Mobility

Since the beginnings of higher education, students and scholars have traveled abroad to pursue academic endeavors (Altbach, 2004). However, today's world has seen reductions in time and distance barriers with the rise of ICT and low cost international transport that have enabled cross-border activities to become an integral and rapidly intensifying aspect of higher education (Marginson and Rhoades, 2002). One of the most visible aspects of these cross-border activities is international student mobility, which has increased nearly 4-fold since 1975, and an estimated 3 million students studied internationally in 2007 (OECD, 2009).

The importance of cross-border activities can be seen in two concepts now at the forefront of many discussions surrounding higher education. Those concepts, internationalization and globalization, have become keys aspects of higher education policy and strategic planning at the international, national, and institutional levels (Marginson and van der Wende, 2007a; Wit, 2008c). As Wit states, "the internationalization of higher education is one of the ways a country or an institution responds to the impact of globalization, but also the internationalization of higher education is itself an agent of globalization (2008c, pg. 3)." Nations and HEIs vary substantially in their ability to respond to globalization's effects and to engage in internationalization activities (Marginson and van der Wende, 2007a).

This chapter provides a contextual background for understanding the most visible of those internationalization activities, namely international student mobility. The first section includes a brief introduction to internationalization and globalization. The second section examines the increasingly global and competitive higher education environment being fostered by globalization and in which LTRS, particularly global rankings, have emerged. The most notable European responses to those pressures, the Bologna Process and Lisbon Strategy, are also discussed. The third section presents an introduction to concepts behind student mobility, focusing on the national and institutional rationales for international student recruitment. The final section examines the worldwide and EU/EFTA regional scope of international student mobility from a quantitative perspective drawing upon data from the OECD and UNESCO.

2.1 Globalization and Internationalization in Higher Education

While the concept of internationalization has a longer history, globalization has only become a significant discourse in higher education since the late 1990s (Marginson and van der

Wende, 2007a). While there is overlap and interplay in the ideas of internationalization and globalization, “one of the key distinctions between the two concepts is the notion of control (Altbach, Reisberg and Rumbley, 2009, pg. 23).” As Scott argues, “not all universities are (particularly) international, but all universities are subject to the same process of globalization - partly as objects, victims even, of these processes, but partly as subjects, or key agents, of globalization (1998, pg. 122).” This statement alludes to a common view that “globalization and its effects are beyond the control of any one actor or set of actors (Altbach, Reisberg and Rumbley, 2009, pg. 23).” Internationalization on the other hand can be seen as “the voluntary and perhaps creative ways of coping” with the forces of globalization (Altbach, 2004, pg. 6). This section provides a brief introduction to the two concepts, focusing on the role they play in cross-border higher education, particularly international student mobility.

2.1.1 Globalization

The term globalization did not come into common vernacular until the 1960s and early 1970s, and discussion surrounding the concept accelerated greatly in the late 1980s and early 1990s following the fall of communism (Held and McGrew, 2002). Higher education scholars have offered useful explanations; Marginson and Rhoades see globalization as the “development of increasingly integrated systems and relationships beyond the nation” that involve economic, technological, cultural and political aspects (2002, pg. 288). Barrow sees globalization as a policy-driven process involving increased global interdependence, where actions taken by one government for national purposes have effects beyond their borders (2004). Interdependence is also noted by Knight who offers perhaps the most useful definition in a student mobility context as “the flow of people, culture, ideas, values, knowledge, technology and economy across borders resulting in a more interconnected and interdependent world (2007, pg. 23).”

Scholars also offer definitions of globalization in regards to its wide-ranging effects on higher education. In this context, Altbach defines globalization as “broad economic, technological, and scientific trends that directly affect higher education and are largely inevitable (2004, pg. 5).” Beerkens adds the idea that globalization is a process that affects international linkages and fosters a more integrated higher education system at a global level (2004). Altbach and Knight see globalization as “the economic, political, and societal forces pushing 21st century higher education toward greater international involvement (2007, pg. 290).”

Regardless of how one defines globalization, it is clear the processes and forces attributed to it are having ongoing impacts on higher education (Altbach, Reisberg and Rumbley, 2009). Yet,

at the same time, higher education itself also increasingly shapes and spreads globalization (Marginson and Rhoades, 2002; Wit, 2008c). Individual HEIs and nations are not immune to globalization forces and cannot ignore its effects (Marginson and van der Wende, 2007a). While those forces are usually considered outside the control of individual governments or HEIs (van der Wende, 2007), efforts are made to minimize their negative impacts (Marginson and Rhoades, 2002). One of the primary ways HEIs, as well as national and supra-national governments, attempt to adapt and cope with globalization is through internationalization activities (Altbach, Reisberg and Rumbley, 2009; van der Wende, 2007; Wit, 2008c).

2.1.2 Internationalization

There are also many definitions used for internationalization in higher education (Wit, 2008c). Altbach sees it as "specific policies and programmes undertaken by governments, academic systems and institutions, and even individual departments or institutions to cope with or exploit globalization (2004, pg. 7)." Beerkens adds the idea of fostering of more international linkages into the three traditional functions of HEIs[3] (2004). Knight's definition again perhaps best captures the essence of internationalization for the context of this study as "the process of integrating an international, intercultural, and global dimension into the purpose, functions (teaching, research, service) and the delivery of higher education (2007, pg. 23)."

Internationalization activities fall into two primary areas, namely home or abroad (Altbach, Reisberg and Rumbley, 2009). Internationalization abroad activities include mobility programs for local students and staff, establishing branch or franchise campuses in other countries, and cooperation agreements between institutions and/or governments in different countries. Internationalization at home, on the other hand, includes activities such as the integration of global perspectives into curriculums and campus life, as well as recruitment of international students and scholars (Altbach, Reisberg and Rumbley, 2009; Knight, 2007).

There is significant variation between national governments and HEIs in the level of resources available to engage in internationalization (Altbach, Reisberg and Rumbley, 2009). Yet, an International Association of Universities survey showed internationalization was a high priority for 73% of responding university-level HEIs in 96 countries (n = 526) (Knight, 2006). A further 23% reported it was a medium priority. Improving competitiveness was cited as the most important national-level rationale behind internationalization efforts. While competition

[3] Namely teaching, research and service. See Mora, J., and Vila, L. (2003).

based rationales for internationalization may not be dominant in all countries, they have become more prevalent in the past ten years (Agarwal et al., 2008). In addition, while few HEIs secure direct profits from internationalization efforts, such initiatives may help improve the institution's competitiveness (Altbach and Knight, 2007). With international competition between countries and HEIs expected to intensify in coming years, it is possible that competiveness rationales will become even more widespread at all levels of higher education.

2.1.3 Concluding Remarks

Higher educations systems and HEIs remain primarily subject to local and national influences and expectations, yet the impacts of globalization are increasing (Marginson and Rhoades, 2002). Internationalization is often used to cope with globalization's effects. Research has shown dramatic increases in internationalization activities at governmental and institutional levels. Examples of recent trends in these activities include increased collaborative research, a spread of new curriculum ideas and teaching and learning methods, and more international mobility of students, scholars, programs and HEIs (Altbach, Reisberg and Rumbley, 2009). In regards to the latter, globalization may help facilitate increased mobility, particularly among students (Altbach, 2004). However, globalization has also contributed to shifts in many countries in the rationale behind international student recruitment towards revenue generation through the higher tuition fees paid by international students (Maassen and Cloete, 2006).

2.2 Global Competition and European Responses – Bologna and Lisbon

In most economically developed countries, a shift has occurred away from economies based primarily on physical capital and production to a 'knowledge economy' based more on human capital and intellectual property (Barrow, 2004). A nation's or organization's competitiveness is increasingly dependent on the human capital of its members. Competition for workers with high levels of human capital, particularly in science and technology, is increasingly international and has become a key aspect of globalization (Box and Basri, 2008). In this environment, higher education has taken on greater significance as HEIs are expected to contribute to generation of human capital and production of new knowledge (Altbach, 2004).

The rise of the knowledge economy and the increasing pressures of globalization have led to increased competition in higher education, in both national and international contexts. This competition takes place not just between HEIs, but also among national and supra-national governments (Altbach, Reisberg and Rumbley, 2009; Marginson and van der Wende, 2007b).

In a European context, competition in higher education has become more commonplace, despite many areas of the region having philosophies traditionally based on cooperation and relative equality among HEIs (Marginson and van der Wende, 2007a). In some countries and HEIs this competition is particularly important as rationales behind internationalization strategies are shifting away from political, educational or cultural motives, and more towards economic factors (Beerkens, 2004). Part of the impetus behind these shifts is an ongoing trend towards reduced birth rates and ageing populations in many European countries. This trend, coupled with insufficient interest among local students to meet national research capacity needs in science and technology, has led to increased importance of skilled migration rationales behind international student recruitment (van der Wende and Middlehurst, 2004).

Intensifying competition in higher education has resulted in nations and HEIs being judged increasingly on a global level (Marginson and van der Wende, 2007b). Consequently, HEI performance in those judgments (e.g. global LTRS), can affect their competitiveness (van der Wende, 2008). Higher education has a long-established hierarchy with research-intensive HEIs in developed nations primarily at the 'center' and the majority of other nations and HEIs at the 'periphery' (Altbach, Reisberg and Rumbley, 2009). The rise of global LTRS has heightened awareness of that gap, and contributed to increased global competition, as peripheral HEIs, countries, and regions seek to improve their standing and move towards the center (Altbach, Reisberg and Rumbley, 2009). As this global competition between HEIs, particularly elite institutions, intensifies, it may contribute to greater vertical differentiation between research-intensive HEIs and other types of institutions (van der Wende, 2007). Costs may also rise as increasingly lucrative packages are used to lure top researchers and graduate students seen as vital to maintaining and increasing competitiveness (van der Wende, 2007).

2.2.1 The Bologna Process

Europe has seen substantial intergovernmental and supra-national responses to globalization. Perceived decreases in global competitiveness, as well as increased competition from the US, and the rapidly growing higher education systems in Asia (Wit, 2008b), has led European governments to begin some of the most significant cooperation agreements in the history of higher education, namely the Bologna Process and the Lisbon Strategy. These developments have been undertaken with the hope that such cooperation will help increase competitiveness of the EU and its member states, particularly in higher education (van der Wende, 2009).

What became known as the Bologna Process can be seen as a response to a growing sense in the late 1990s that Europe had become less competitive, particularly in relation to the US, in international higher education (Marginson and van der Wende, 2007a). After a first meeting in Paris in 1998, attended by representatives from France, Germany, Italy, and the UK, a larger meeting in Bologna in 1999, saw 29 countries sign a declaration[4]. Among the key goals in that declaration was to ease and increase student mobility within the region, and to make European higher education more attractive to people outside the region (Rivza and Teichler, 2007). This is being done through the creation of a European Higher Education Area (EHEA), a convergence of degree structures towards three cycles[5], expansion of the European Credit Transfer System (ECTS), and cooperative agreements in quality assurance (Olsen, 2007).

The Bologna Process is focused on cooperation rather than conflict as an instigator of change (Wit, 2008b). It was started as a voluntary non-binding intergovernmental agreement resulting in a relatively bottom-up approach from an EU perspective (van der Wende, 2009). However, while the European Commission's (EC) role was limited at the beginning, its involvement has expanded substantially (van der Wende and Middlehurst, 2004). Bologna was established without the creation of an administrative support system, a permanent secretariat or a funding base (Olsen and Maassen, 2007). This provided an opportunity for the EC to become more involved by providing funding and staff support. Bologna reforms and EU higher education agendas, notably the Lisbon Strategy, have grown closer together (Olsen and Maassen, 2007).

2.2.2 The Lisbon Strategy

The so called Lisbon Strategy began in 2000 with the release of a set of conclusions reached by the European Council including the goal for Europe to "become the most competitive and dynamic knowledge-based economy in the world (Lisbon European Council, 2000)." Part of the rationale behind the Lisbon strategy was a growing feeling that Europe was 'lagging behind' in research and development, particularly in regards to the US (Wit, 2008b). The strategy cites the EU's lower levels of R&D investment (Marginson and van der Wende, 2007a) and calls for creation of a European Research Area (ERA) (Olsen and Maassen, 2007).

[4] The signatory list has now grown to 46 countries and includes all members of the EU, as well countries from the extended Europe region. In addition the European Commission as well as eight higher education organizations (e.g. UNESCO and the European Universities Association) are now members as well. A full list of participants can be found at http://www.ond.vlaanderen.be/hogeronderwijs/bologna/pcao/.

[5] Originally based on undergraduate and graduate, the system is now three-cycles: bachelor, master and doctoral.

As it originated with the European Parliament, the Lisbon Strategy, in contrast to the Bologna Process, can be seen as a relatively top-down supra-national initiative (van der Wende, 2009). While the initiatives do have some overlapping aims, the Lisbon Strategy is a more general process that is not completely focused on higher education (van der Wende and Middlehurst, 2004). However, the Lisbon Strategy provided the European Commission with a political mandate to be more directly involved in higher education, an area in which it does not have legal jurisdiction (Marginson and van der Wende, 2007a). Among the ideas implicit in the Lisbon Strategy related to student mobility, is a shift in rationales towards searching for the best students regardless of nationality, with a hope they will stay in the EU to help the region overcome an ageing population and reduced labor force (Wit, 2008b). Lisbon is also based on the rationale that creating the ERA will foster a more positive research environment that will help combat loss of EU students and scholars to other countries such as the US (Wit, 2008b).

2.2.3 Concluding Remarks

The Bologna Process and Lisbon Strategy can be seen as the main European higher education responses to globalization pressures (van der Wende, 2009, pg. 320).” Bologna can be seen as a response and as a new type of internationalization (Wit, 2008b). Bologna and Lisbon have become the most important contributors to internationalization policies and programs in Europe (Wit, 2008b). These and other “actions resulting from the Bologna Process and the Lisbon Strategy are seen as decisive to keeping Europe competitive in attracting the best international students and scholars from around the world (Wit, 2008b, pg. 195).”

2.3 Introduction to Cross-border Education and Student Mobility

This section provides an introduction to the concepts and definitions behind cross-border education and its most visible activity, international student mobility. In order to better understand the policy environment in which international students select a HEI, institutional and national level rationales behind international student recruitment are discussed. In addition, the directions and impacts of the primary flows of student mobility are examined.

2.3.1 Definitions

According to Knight, cross-border education can be defined as “the movement of people, programmes, providers, curricula, projects, research and services across national or regional jurisdictional borders (2007, pg. 24).” While cross-border education traditionally took place predominately through mobility of individuals, in recent years programs and institutions have

also become increasingly internationally mobile (Wit, 2008c). However, student mobility remains the most visible and largest component of cross-border education (Knight, 2007).

While student mobility has many forms, Rivza and Teichler note four primary types (2007):

> **Temporary:** students studying internationally for shorter periods and not pursuing a full degree. Often takes the form of student exchanges and cooperation agreements.
> **Degree:** students studying internationally for extended periods in pursuit of a degree.
> **Vertical:** students studying abroad in countries or at HEIs where the higher education delivered is seen as more academically advanced. This mobility is typified by the large number of students from developing regions studying in more developed nations.
> **Horizontal:** student mobility between systems, countries, and/or HEIs that have similar levels of academic advancement in higher education. This type is commonly seen in mobility of North American students to Europe and in large number of students from the European region studying in other countries within the region.

Determining how international students should be defined is a leading debate in the context of cross-border education (Wit, 2008a). As a result, there is no consensus in many terms related to student mobility, and the definitions of what constitutes an international student vary between countries, institutions, and international organizations (Wit, 2008b). In many cases, international student status is determined by nationality or citizenship, which can sometimes lead to deceiving and/or inaccurate data. As an example, in many EU countries 'international students' may hold citizenship in their family's country of origin, yet have received most or all of their prior education in the 'host' country (Wit, 2008b). Consequently, definitions based on nationality/citizenship can overestimate actual international student numbers. One study[6], which compared 'foreign student' estimates with more accurate data available in seven EU countries, found that in six of those countries, over 20% of those students in 2002/03 were actually permanent residents of the country (Lanzendorf, 2006).

As the last example shows, the collection of accurate, consistent and comparable student mobility data is complicated by the lack of a clear definition (Wit, 2008a). This situation led the OECD, the UNESCO Institute for Statistics, and Eurostat to recently collaborate on the following definition of international students: "students who have crossed borders and moved to another country with the objective to study (UNESCO-UIS/OECD/Eurostat, 2008, pg.

[6] For a detailed examination of the challenges of measuring international student mobility with a focus on the European context see Kelo, Teichler, and Wächter (2006).

39).” Operationalization of this definition is left to individual countries, and is based primarily on the combination of following three criteria that best fits the nation’s context: country of permanent residence, country of prior education where the student gained their higher education entry qualification, and country of citizenship. The latter however, is not considered a sufficient measurement of mobility and should be used in combination with one or both of the other criteria (UNESCO-UIS, 2009). However, it will likely take some time before more accurate and comparable measurements of student mobility are available internationally.

2.3.2 National and Institutional Rationales behind International Student Recruitment

While this study focused on the choice of a HEI by international students, that choice takes place in an atmosphere influenced by national and HEI level initiatives and policies. Vincent-Lancrin identifies four primary rationales behind those policies in the context of international student recruitment (2004). This section explores those rationales with a focus on European host country contexts

Mutual understanding rationales are based on cultural, academic, political and/or development aid goals. As an example, from an inbound mobility perspective, local students and other members of a society are exposed to individuals from other cultures. In turn, international students are exposed to the host culture, helping to build positive relationships between the countries. This rationale is also related to cooperative agreements and strategic alliances formed to foster student mobility (e.g. ERASMUS) (Knight, 2007).

Capacity building rationales are based on student mobility as a means to advance a nation’s capacity in areas that will aid their development. A prime example can be seen in situations where HEIs in developed nations host students from developing nations. Many developing nations are seeing rising demands for higher education, but insufficient capacity. This limits their ability to meet national development needs (Knight, 2007). In a European context, this type of mobility often follows former colonial ties (van der Wende and Middlehurst, 2004).

Skilled migration rationales are related to the needs of the host country in relation to human resources. With the rise of the knowledge economy, and the need to develop human capital, many countries view recruiting international students as potential migrants as a means to overcome shortfalls in labor supplies, particularly in highly skilled areas (Verbik and Lasanowski, 2007). This type of recruitment can be especially important at the graduate education level, notably in science and technology, where interest among local students may

be insufficient to meet national research capacity needs (van der Wende and Middlehurst, 2004). In addition, ongoing demographic shifts in Europe have resulted in many countries experiencing reduced birth rates and ageing populations. These shifts provide added incentives for international student recruitment (van der Wende and Middlehurst, 2004).

Revenue generation rationales are based on economic benefits that can be brought to a nation's higher education system and HEIs through tuition fees paid by international students. This rationale is common in English speaking countries such as Australia, the US (at undergraduate levels), New Zealand, and the UK (recruitment of non-EU students) (Vincent-Lancrin, 2004). These countries have become somewhat dependent on such revenue, and their international student recruitment is primarily oriented towards short-term benefits these fees can provide (van der Wende and Middlehurst, 2004). Other than the UK, most other European countries are focused more towards long-term competitive benefits that can accrue from international student recruitment (van der Wende and Middlehurst, 2004). Yet, with growing financial pressures on higher education systems, the revenue generation rationale is increasing in importance, even if it is not yet the primary rationale in most EU countries (Knight, 2007).

The four rationales are not mutually exclusive, and no host country follows a single rationale towards international students. There is often interplay and conflict between rationales and the importance of each can change over time. In a European context, student mobility has been primarily policy driven (Vincent-Lancrin, 2004), with many countries having policies for cross-border education based more upon cooperation than competition. Yet, decreasing funding allocations from national governments increasingly put those ideals at odds (van der Wende and Middlehurst, 2004). As a result, there has been a shift towards policy focusing more upon cooperation within the European region, but on competiveness for mobility to and from areas outside the region. Thus, rationales for inbound student mobility from outside the European region are moving away from capacity building and mutual understanding, towards skilled migration and revenue generation (Wit, 2008b). In terms of outbound mobility, the primary rationale remains mutual understanding, but is increasingly related to skilled migration, notably to combat the loss of talent to countries outside the region (Wit, 2008b).

The ideals behind these rationales can also be applied at institutional levels. As with nations, the relative importance of each rationale varies between HEIs. From a mutual understanding perspective, the recruitment of international students can help broaden the intercultural understanding of local students, scholars, and staff (Knight, 2007). For many HEIs this is the

most important rationale in their international mobility strategies (Altbach and Knight, 2007). Individual HEIs are also often instrumental players in national initiatives for capacity building in developing nations. HEIs can also be a prime beneficiary of skilled migration related rationales to international student recruitment. These students often become an important source of research and teaching assistants (Altbach and Knight, 2007), and provide an influx of talent which can boost research and knowledge production at a HEI (Knight, 2007).

While other rationales certainly play a role at the institutional level, revenue generation has taken on increased significance. International students in many countries have transitioned from being primarily funded through national and institutional scholarships, to a situation in which most are self financed (Varghese, 2008). This situation, combined with reductions in government funding, has led many HEIs to view international student tuition fees as new revenue streams (Knight, 2007; Marginson and van der Wende, 2007a; Varghese, 2008). An additional institutional level rationale for recruitment of international students can be to improve the profile and international reputation of the HEI (Knight, 2007). This can be traced to the fact that many HEIs with extensive internationalization initiatives, including large international student populations, are often seen among the more prestigious institutions (Scott, 1998). The rise of global LTRS, and the use of a HEI's international student ratio as an indicator in the Times Higher Education rankings, gives an added dimension to this rationale.

2.3.3 International Student Migration and the Brain Drain/Circulation Discourse

The two rationales that have taken on greatly increased importance in the past twenty years, skilled migration and revenue generation, bring many benefits to host countries. However, those benefits often come with associated costs for the countries of origin of students involved. Most international students are self financed; mostly through family and/or governmental sources in their home country (Altbach, 2004). Consequently, the benefits from tuition fees and living expenses that accrue to host countries following revenue generation rationales often constitute a significant drain on available resources in developing countries, and in some cases the drain is larger than the foreign aid a country receives (Altbach, 2004).

Skilled migration rationales can also result in significant brain drain from developing nations. Brain drain can be seen as the loss of output and production from a nation's individuals who choose to live in a different country (Box and Basri, 2008). While some international students come to developed nations solely for the higher education provided, many others choose to study internationally with hopes of being able to migrate after graduation (Teichler and Yagci,

2009). As a result, developed nations often attract talented students with valuable human capital needed in their home countries (Altbach, Reisberg and Rumbley, 2009).

Recently the discourse has shifted away from brain drain, which has developed a negative connotation, towards a concept of circulation (Teichler and Yagci, 2009). The latter concept is based on the idea that international students who remain abroad after graduation contribute to their home nations through remittances, distribution of knowledge, and for some, an eventual return (Teichler and Yagci, 2009). Discussions of brain circulation from a developed nation perspective, often stress that such migration does not imply a purely zero-sum game with home nations losing to the benefit of host nations. Also stressed is that the productivity such students could have at home, given the infrastructure in place there, should be taken into account (Box and Basri, 2008). In contrast, others note that brain circulation discourses downplay the negative impacts migration of international students can have on developing nations (Teichler and Yagci, 2009), and that the dominant trend remains for students to stay in host nations without clear benefits to their home nations (Luchilo and Albornoz, 2008).

2.3.4 Directions of International Student Flows

Brain drain/circulation is exacerbated by the predominant one-way flow of international student mobility from developing to developed countries. Yet, there are other international student flows. Some nations are more active exporters of students, while others are primarily importers. Few nations have a balance between incoming and outgoing student flows (Marginson, 2006). Directions of these flows change over time and are affected not only by student choices, but also by policies created by international organizations, governments and HEIs (Altbach, Reisberg and Rumbley, 2009). Current flows take two primary forms.

The first primary flow is based on vertical and degree mobility (Wit, 2008a) and is primarily from developing (i.e. South) countries towards more developed nations (i.e. North) (Altbach, 2004). Vertical mobility involving North-South student flows remains small (Agarwal et al., 2008). Many developing countries, with urging from the World Bank and the IMF, have concentrated on developing primary and secondary education systems. As these develop, increasing numbers of secondary school graduates are not accommodated by their higher education systems, which have insufficient capacity due to less funding and attention. Thus many graduates are driven to developed nations, many of which have excess capacity, to pursue higher education (Barrow, 2004). This has helped bias incoming international student flows towards countries with more developed higher education systems and to more high-

status HEIs within those systems (Altbach and Knight, 2007). This in turn contributes to brain drain when those students remain in the host countries. While the US has been the dominant recipient country of this type of flow, recently increasing percentages of students, notably from Asia, are being drawn to Europe, Australia and New Zealand (Lee, 2008; Wit, 2008a).

The second primary international student flow is based on horizontal mobility and mainly involves North-North flows such as North American students studying in Europe and the extensive intra-European mobility aided by ERASMUS and other EU and national programs. This horizontal North-North mobility is often temporary, with students spending short periods of time in host countries before returning to their home country and/or HEI (Wit, 2008a).

The dominance of these two flows may be changing. UNESCO data comparing international degree-seeking student data from 2007 with 1999 shows a trend towards intra-regional and South-South mobility (UNESCO-UIS, 2009). Six of the nine regions examined showed increases in intra-regional student mobility: Arab States (from 12% to 16%), Central and Eastern Europe (25 to 28%), Central Asia (29 to 35%), East Asia and the Pacific (36 to 42%), Latin American and the Caribbean (11 to 23%), and Sub-Saharan Africa (18 to 23%), while three regions showed slight declines: North America (40 to 39%), Western Europe (77 to 76%), and South and West Asia (3 to 1%). However, what is also evident from these figures are the strong differences between regions in the level of intra-regional mobility taking place.

International student flows can also be examined at a linguistic level. From this perspective, flows have been predominately directed towards English speaking nations. In 2007, Australia, Canada, Ireland, New Zealand, the UK, and the US combined, held nearly half of the global international student market (UNESCO-UIS, 2009). Part of the reason for this strong flow is that English is now the most widely spoken second language in the world, which has helped these countries become dominant forces in international higher education (Altbach, 2004). However, recent data suggests their dominance may be changing, and in 2007 international students were more widely geographically distributed than in the past (UNESCO-UIS, 2009). This change may be the result of the fact that English speaking countries are seeing increased competition from non-English speaking countries, in Europe and elsewhere, that now offer English language degrees, particularly at graduate levels, in order to attract more international students (Altbach, 2004; Maassen and Cloete, 2006; Marginson and van der Wende, 2007a).

2.3.5 Concluding Remarks

Engaging in cross-border education activities has become a key internationalization strategy at national and institutional levels, to respond to, and in many cases capitalize on the effects of globalization. While these activities have changed over time, international student mobility remains the most visible (Varghese, 2008). In a European context, student mobility has become a significant policy goal in the past ten years (Rivza and Teichler, 2007). Yet, in that time, the rationales behind international student recruitment have begun to change in many European contexts. Mutual understanding has long been an important aspect of European policy rationales regarding student mobility. However, today's more globally competitive higher education environment fosters an increased importance in the skilled migration and revenue generation rationales, particularly in regards to students from outside the region.

2.4 International Student Mobility Data

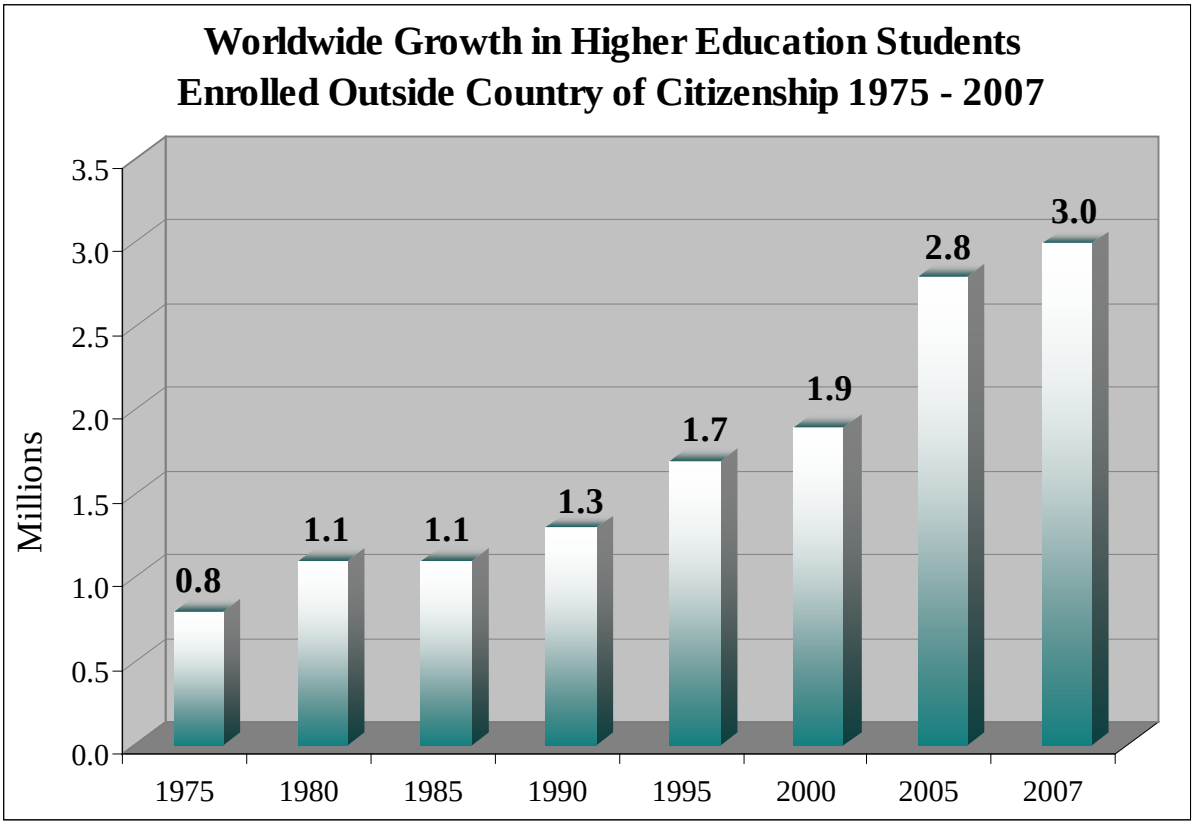
The origins of cross-border student mobility can be seen as far back as 300 B.C. when Greek scholars were drawn to Alexandria, Egypt to advance their knowledge (Cantwell, Luca and Lee, 2009). HEIs in India also drew students from abroad over a thousand years ago (Wit, 2008a). Student mobility also has a long standing history in European higher education. Some historians estimate 10% of higher education enrollments in the medieval period were cross-border students (Rivza and Teichler, 2007). Despite its early beginnings, only since the late 20th century has international student mobility become a substantial aspect of higher education (Wit, 2008a). This section examines recent growth in the number of international students, both worldwide and within the EU/EFTA region.

2.4.1 Worldwide Scope of International Student Mobility

Varying data collection practices and definitions in use in individual countries makes creating comparable data on international student mobility difficult (UNESCO-UIS, 2009). Nonetheless, both the OECD and the UNESCO Institute for Statistics (UNESCO-UIS) release yearly estimates of the number of degree-seeking international students worldwide. Figure 1 shows the rise in the number of students studying outside their country of citizenship based on estimates from the OECD[7]. The rate of increase accelerated in recent decades and rose 47% between 2000 and 2005 compared to 11% between 1995 and 2000. In 2007 over 3 million students were estimated to be studying outside their country of citizenship (OECD, 2009).

[7] While UNESCO-UIS data is likely a more accurate reflection of current student mobility, its recent definition change complicates comparing long-term growth. Thus, OECD data is presented for this time series comparison.

Figure 1: Growth in Worldwide International Student Mobility (1975-2007)

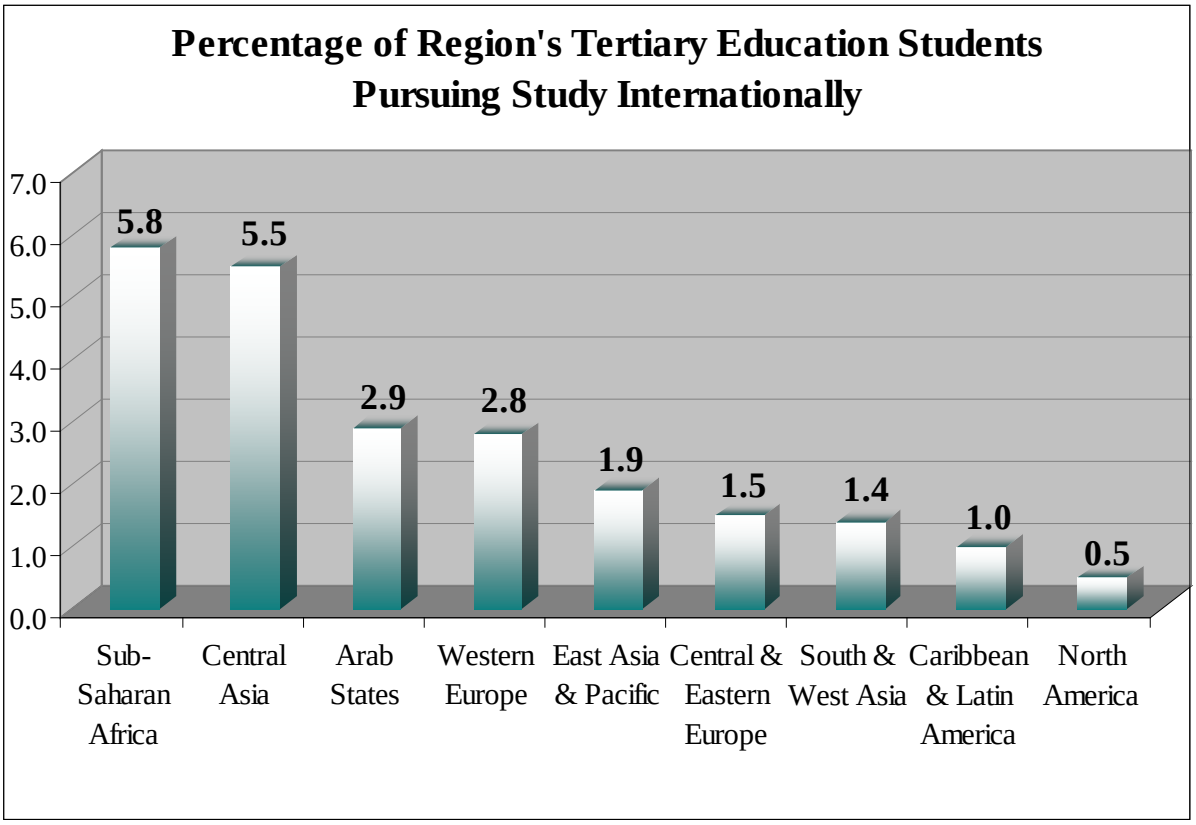


Source: OECD Education at a Glance 2009

UNESCO-UIS uses a different definition[8] than the OECD and estimated there were 2.8 million international students worldwide in 2007 (2009). In comparison, the estimated overall number of students pursuing higher education worldwide was over 150 million. Overall and international student enrollments have increased at similar rates. As a result, the percentage of all higher education students that are studying internationally (i.e. outbound ratio) has remained relatively constant: 1.7% in 1980, 1.8% in 1990, 1.9% in 1999 and 1.8% in 2007. However, while the overall worldwide outbound ratio has remained relatively flat, substantial change has taken place since 1999 at regional levels. In that time, outbound ratios in four regions rose considerably: South and West Asia 40% (1 to 1.4%), Central Asia 25% (4.4 to 5.5%), Sub-Saharan Africa 17% (5 to 5.8%), Arab States 16% (2.5 to 2.9%). Western Europe experienced a decline of 15% (3.3 to 2.8%). Other regions remained essentially flat (UNESCO-UIS, 2009). Figure 2 shows estimated regional outbound mobility ratios for 2007.

[8] UNESCO estimates give preference to country of permanent residence and/or prior education over country of citizenship. In order to present a clearer longitudinal growth trend, OECD estimates still incorporate country of citizenship as the primary determinant of international student status. As a result, the two estimates vary most substantially in the European context where free movement of people and the high numbers of lifelong or long-term residents without citizenship in some countries makes estimates based on citizenship more misleading. As a result, UNESCO-UIS data which better reflects the European context will be used for the rest of this analysis.

Figure 2: Regional Outbound International Student Mobility Ratios (2007)



Source: UNESCO-UIS Global Education Digest 2009

Looking at student mobility data at the national level also shows substantial variation in the number of students studying internationally, outbound mobility ratios, number of international students hosted, and inbound mobility ratios. Table 1 shows the top ten countries of origin and destination for international students in 2007. The data shows a clear preference among international students for specific destinations. The top five and top ten host countries attracted 58% and 70% of the worldwide total respectively (UNESCO-UIS, 2009). From a sending country perspective, the picture is somewhat more diverse. Nevertheless, the top five countries represented 29% of all international students in 2007. This was dominated by China, which had more students studying abroad than the other four top-five countries combined.

The stature of many countries in international student mobility can be related to the sheer size of their higher education systems. Prime examples from an outbound perspective are Japan, India, the Russian Federation, and the US which were among the top ten in the number of students studying internationally, but had outbound mobility ratios well below the worldwide average. Of the six countries appearing in both top ten groups, only three, Canada, France, and Germany, had inbound and outbound mobility ratios above the world average. Looking

deeper into the data showed few nations with truly international higher education systems. Only eight countries that hosted at least 5000 international students in 2007 had inbound and outbound mobility ratios above 4%: Austria, Cyprus, Hong Kong, Ireland, Jordan, Lebanon, Norway, and Switzerland. Cyprus and Ireland were the only nations above 8% for both ratios.

Table 1: Leading Host Countries and Countries of Origin for International Students (2007)

Top Countries of Origin

Country	Students Studying Abroad	% of World Total	Outbound Mobility Ratio
China	421,148	15.0%	1.9%
India	153,312	5.5%	1.1%
Rep. Korea	105,327	3.8%	3.1%
Germany[1]	77,534	2.8%	2.8%
Japan	54,506	1.9%	1.2%
France	54,021	1.9%	2.5%
USA	50,265	1.8%	0.3%
Malaysia	46,473	1.7%	6.1%
Canada[2]	43,918	1.6%	3.0%
Russian Fed.	42,881	1.5%	0.5%
All other	1,751,085	62.5%	
World	2,800,470		

Source: UNESCO Global Education Digest 2009 except
1: Outbound mobility ratio 2005 (UNESCO-UIS, 2007)
2: Outbound mobility ratio 2006 (UNESCO-UIS, 2008)

Top Host Countries

Country	International Students Studying in Country	% of World Total	Inbound Mobility Ratio
USA	595,874	21.3%	3.4%
UK	351,470	12.6%	14.9%
France	246,612	8.8%	11.3%
Australia	211,526	7.6%	19.5%
Germany[3]	206,875	7.4%	8.8%
Japan	125,877	4.5%	3.1%
Canada[3]	68,520	2.4%	5.2%
South Africa[4]	60,552	2.2%	7.2%
Russian Fed.	60,288	2.2%	0.6%
Italy	57,271	2.0%	2.8%
All other	815,605	29.1%	
World	2,800,470		

3: Inbound mobility ratio estimated from 2005 total tertiary enrollment (UNESCO-UIS, 2006)
4: Inbound mobility ratio 2006 (UNESCO-UIS, 2008)

2.4.2 EU/EFTA Regional Scope of International Student Mobility

The region made up of the 31 members of the EU and the EFTA attracts the highest number of international students in the world. As presented in Table 2, according to UNESCO-UIS estimates, the EU/EFTA region hosted over 1.2 million international students in 2007 (2009). This represented 44% of the worldwide total. This was 84% more than the US/Canada region, which had similar overall higher education enrollments. One third of the EU/EFTA total took the form of intra-regional international student mobility which represented 15% of the world's total. The nearly 800,000 students drawn from outside the EU/EFTA region was 28% of that total and far exceeded the number of international students in the US/Canada. The overall inbound mobility ratio for the region (6.4%) was three times the worldwide ratio. Yet, there was substantial variation in the region in terms of the mixture of international students from within the region and those from outside. Some such as France and Portugal had less than 20% come from the EU/EFTA region. In contrast, others such as Austria, the Czech Republic, and Greece had over 60% of their international students come from other EU/EFTA countries.

Table 2: EU/EFTA Inbound and Outbound Student Mobility (2007)

Country	Total HE Enrollment in Country	Outbound Students				Inbound Students			
		Overall		To EU/EFTA		Overall		From EU/EFTA	
	(000s)	Total	Mobility Ratio[6]	Total	%	Total	Mobility Ratio[6]	Total	%
Austria	261	10,458	4.3%	9,111	87.1%	43,572	16.7%	29,076	66.7%
Belgium	394	10,596	2.8%	9,347	88.2%	25,202	6.4%	13,069	51.9%
Bulgaria[1]	259	24,680	8.8%	19,245	78.0%	9,100	3.5%	1,383	15.2%
Cyprus[1]	22	22,898	110.7%	21,896	95.6%	5,590	25.1%	676	12.1%
Czech Republic	363	7,359	1.7%	6,046	82.2%	24,483	6.7%	18,741	76.5%
Denmark	232	5,035	2.1%	3,667	72.8%	12,695	5.5%	9,118	71.8%
Estonia	69	3,245	5.0%	2,394	73.8%	966	1.4%	708	73.3%
Finland	309	5,964	1.9%	4,989	83.7%	10,066	3.3%	3,418	34.0%
France	2,180	54,021	2.5%	40,236	74.5%	246,612	11.3%	45,035	18.3%
Germany[1]	1,979	77,534	4.2%	63,685	82.1%	206,875	10.5%	70,569	34.1%
Greece	603	32,588	4.6%	28,703	88.1%	21,160	3.5%	13,195	62.4%
Hungary	432	7,214	1.4%	6,157	85.3%	15,110	3.5%	9,180	60.8%
Iceland	16	2,480	15.7%	1,952	78.7%	783	4.9%	572	73.1%
Ireland	190	19,357	9.7%	17,878	92.4%	16,758	8.8%	5,736	34.2%
Italy	2,034	35,133	1.6%	26,808	76.3%	57,271	2.8%	17,772	31.0%
Latvia	129	3,858	3.2%	2,504	64.9%	1,433	1.1%	668	46.6%
Liechtenstein	1	884	132.6%	877	99.2%	582	86.5%	471	80.9%
Lithuania	200	6,762	3.7%	5,026	74.3%	1,901	1.0%	813	42.8%
Luxembourg[2]	3	7,201	269.2%	7,093	98.5%	1,137	42.2%	970	85.3%
Malta[3]	9	1,033	8.6%	966	93.5%	605	6.4%	162	26.8%
Netherlands	590	10,447	1.9%	8,103	77.6%	27,449	4.7%	13,990	51.0%
Norway	215	11,873	5.8%	8,740	73.6%	15,618	7.3%	5,289	33.9%
Poland	2,147	32,888	1.5%	29,018	88.2%	13,021	0.6%	3,537	27.2%
Portugal	367	11,200	2.8%	9,983	89.1%	17,950	4.9%	2,718	15.1%
Romania	928	22,852	2.2%	17,755	77.7%	9,383	1.0%	1,230	13.1%
Slovak Republic	218	24,206	10.3%	23,364	96.5%	1,901	0.9%	1,121	59.0%
Slovenia	116	2,244	1.8%	1,853	82.6%	1,195	1.0%	201	16.8%
Spain	1,777	23,914	1.2%	19,202	80.3%	21,315	1.2%	7,484	35.1%
Sweden	414	13,723	3.6%	9,325	67.9%	22,135	5.4%	8,622	39.0%
Switzerland	213	10,485	5.3%	8,411	80.2%	38,317	18.0%	22,029	57.5%
United Kingdom	2,363	24,115	1.1%	11,609	48.1%	351,470	14.9%	118,390	33.7%
EU/EFTA Region[4]	**19,033**	526,248	2.8%	425,943	80.9%	1,221,655	6.4%	425,943	34.9%
North America[4]	**19,086**	93,439	0.5%			663,394	3.5%		
United States	**17,759**	50,265	0.3%			594,874	3.4%		
Canada[5]	**1,327**	43,174	3.0%			68,520	5.2%		
World Total	**150,656**	2,800,470	1.8%			2,800,470	1.8%		

Note: Source UNESCO-UIS Global Education Digest 2009 except where noted.
1. Total HE enrollment data from Statistisches Bundesamt Deutschland http://destatis.de. Inbound and outbound mobility ratios also calculated based on data from Statistisches Bundesamt Deutschland.
2. Data from UNESCO Institute for Statistics Data Centre http://stats.uis.unesco.org. Year of reference is 2006.
3. Data from UNESCO Institute for Statistics Data Centre http://stats.uis.unesco.org. Year of reference is 2005.
4. Inbound and outbound mobility ratio calculated based on total regional enrollments and student mobility totals.
5. Source UNESCO Global Education Digest 2008. Year of reference is 2006.
6. Not calculated except where noted. Source UNESCO Global Education Digest 2009.
Note: Only includes totals for countries reporting student data to OECD and UNESCO Institute for Statistics.

From an outbound perspective there was less variability as 28 of the 31 countries had 73% or more of their students studying abroad doing so in the EU/EFTA region. Overall 80% of international students from the region were studying in other EU/EFTA nations. An estimated 14% of international students from Western Europe were also studying in North America (UNESCO-UIS, 2009). Thus, EU/EFTA student mobility is very North-North oriented. While there were substantial variations in the region's outbound mobility ratios, only six were below the worldwide average (Czech Republic, Hungary, Italy, Poland, Spain, and the UK), and the region's overall outbound mobility ratio (2.8%) was 50% higher than the worldwide ratio.

Among the rationales in the Bologna Process is to increase the attractiveness of the EHEA to international students. Comparing international student enrollment in the EU/EFTA region from 2007 with 1999[9], when the Bologna agreement was signed, shows strong growth. Since 1999, the number of international students in the region increased by 47%. This was slightly below the worldwide increase of 53%. However, over that period the region saw a greater increase in students from outside the EU/EFTA region (72%). The increase in the US/Canada was much lower (35%). As a result, the number of international students in the EU/EFTA from outside the region, which was 7% lower than US/Canada in 1999, is now nearly 20% higher. Overall, the EU/EFTA region gained nearly 400,000 international students since 1999 to reach 1.2 million, and is now clearly the leading destination for international students.

2.5 Conclusions

The world's higher education landscape is seeing substantial changes from globalization and supra-national, national, and institutional level internationalization activities taking place to mitigate its effects. Altbach, Reisberg and Rumbley state that "the developments of the recent past are at least as dramatic as those in the 19th century when the research university evolved, first in Germany and then elsewhere, and that fundamentally changed the nature of the university worldwide (2009, pg. 1)." They also argued that these developments may be more significant since they are occurring worldwide and affecting far more HEIs and individuals.

Among these developments are cross-border education activities, most notably international student mobility (Knight, 2007). While a consensus opinion has not been reached on how to define and measure international student mobility, it has clearly increased substantially in

[9] Estimates were calculated based on raw data from the UNESCO Institute for Statistics Data Centre http://stats.uis.unesco.org. Incoming student data for 1999 was not available for Greece, Liechtenstein, Portugal, and Slovakia. As a result, for those countries, data from later years was used to create the estimates. This may have resulted in a slight overestimation of student mobility in the EU/EFTA area for the year 1999.

recent decades. This mobility now exceeds three million degree-seeking international students, as well as countless more involved in temporary mobility. While flows of students remain primarily inter-regional, South-North and North-North, mobility from a South-South and intra-regional perspective has increased since 1999 and will likely continue to expand.

While there are differences of opinion in terms of the degree of growth, the consensus is that the numbers of international students will increase for the foreseeable future (Verbik and Lasanowski, 2007). One forecast estimates the number of international students to double from current levels to reach 5.8 million by 2020 (Böhm et al., 2004). Some expect that most growth may be at the graduate level (Wit, 2008b). However, future student mobility growth may be impacted by increased higher education capacity in developing nations, expanding distance and online learning options, and the further establishment of branch and franchise campuses. The current global economic crisis may also have extensive impacts on higher education and international student mobility in future years. Despite these challenges, regional, national and institutional level policies and initiatives will continue to foster increased international student mobility. Nonetheless, for such increases to ultimately occur, individual students have to make the decision to study abroad, choose a specific country for that study and select a particular HEI and degree program. The rationales and decision-making factors contribute to students making those choices will be discussed in Chapter 4.

Globalization pressures have contributed to a worldwide market for international students in which nations and individual HEIs compete for market share. The primary responses in European higher education to the pressures globalization are the Bologna Process and Lisbon Strategy. One goal of those initiatives is to help European countries and HEIs better compete in that international student market. The increases in students from other countries studying in the EU/EFTA region, suggests the reforms are aiding the attractiveness and competitiveness of the region. However, scholars question how much of these recent increases can be directly related to Bologna reforms (Rivza and Teichler, 2007). The increases may also be the result of other factors, such as rising demand in countries with rapidly developing higher education systems (e.g. China and India), and to real and perceived difficulties for international students to secure visas in the US in a post-9/11 environment (Rivza and Teichler, 2007). Nonetheless, the EU/EFTA region has clearly become a magnet for international students. Yet, only time will tell if the rise of LTRS, particularly the global rankings in which Continental European HEIs have placed relatively poorly, will impact the strength of that magnet.

Chapter 3: Contextual Background: League Tables and Ranking Systems

While only a significant aspect of the higher education environment for the past twenty-five years in national contexts, and five years on a global basis, LTRS are having dramatic influences and impacts on national higher education systems as well as individual HEIs. In order to provide a contextual background for the primary dependent variable in this thesis, this chapter presents a brief introduction to the rise of national and global LTRS, as well as examples of their impacts and influences, with a focus on the EU/EFTA region.

3.1 Introduction to League Tables and Ranking Systems

Usher and Savino define rankings as a "list of certain groupings of institutions (usually, but not always, within a single national jurisdiction), comparatively ranked according to a common set of indicators in descending order (2006, pg. 5)." In most cases indicators are weighted and combined into a single score. Results are then presented in the form of a 'league table' like the standings in a football league (Usher and Savino, 2006). LTRS can be based on as few as one or as many as dozens of indicators. They can evaluate entire HEIs, or individual departments or disciplines. LTRS can involve rankings at regional, national, and international levels (Usher and Medow, 2009). In Europe the recent trend in national and international LTRS has been to focus on the departmental or disciplinary level rather than rankings of entire HEIs (Usher and Medow, 2009). While most national and international LTRS are created by or in partnership with media companies, recently there has been more governmental involvement (Usher and Medow, 2009).

While the majority of LTRS have been designed as attempts to measure the relative quality of HEIs, there is little consensus in how to measure that quality. Research conducted by Usher and Savino, and updated by Usher and Medow, of 26 national and international level LTRS in 22 countries, found minimal agreement between systems in the choice of indicators and weightings (Usher and Medow, 2009; Usher and Savino, 2006). Research-based indicators were used in the majority of the LTRS examined (18 out of 26) and had the highest overall weighting. There appears to be regional and/or cultural differences in the choice of indicators. LTRS rely on data from a wide range of sources, including surveys, the HEIs themselves, and 3rd parties such as governmental agencies. Despite variations in the source and choice of indicators as well as the use of different indicator weightings, the same HEIs usually appear in the upper echelons of LTRS. There is however, more variation in the middle and lower tiers.

3.2 Rise of LTRS

Stensaker and Kehm offer a useful summary of three primary conditions that facilitated the dramatic rise of LTRS in the last decade (2009). The first condition is the nearly global trend of higher education systems expanding towards mass and universal enrollment levels. This expansion has increased the size of higher education markets, which now often have sufficient student numbers to create viable publishing markets for the media companies involved in the majority of LTRS. Secondly, global expansion in higher education has led to a rise in the number of HEIs, and hence the information requirements for those needing to compare them. The last condition the authors noted is an increase in efficiency and accountability reforms in higher education. In order to enact these reforms, many governments are collecting large amounts of data regarding performance in the higher education sector. That information is often used for LTRS indicators. These three conditions have contributed to demands from students and other stakeholders for transparent comparative information regarding specific HEIs and programs. This section reviews the dramatic recent rise of national and global LTRS that has resulted from these conditions.

3.2.1 Rise of National League Tables and Ranking Systems

While the international elements of higher education have increased dramatically in recent decades, most HEIs and higher education systems remain primarily nationally focused (King, 2009). This has resulted in the majority of LTRS being national in scope (Salmi and Saroyan, 2007). While most early LTRS were produced by or in partnership with media companies (Salmi and Saroyan, 2007), recent years have seen more diversity, as research centers and governmental and non-governmental agencies increasingly establish new LTRS (IHEP, 2009). Most of these national-level LTRS were designed, at least in large part, to provide students and parents with information to aid their choice of a HEI to attend (Dill, 2007).

The US was the logical location for the rise of the first LTRS, since the country has the longest history of mass higher education involving significant competition between HEIs. Early attempts at ranking HEIs and academic programs in the country date from the early 1900s (Webster, 1992). However, only since the establishment of the annual *America's Best Colleges*[10] ranking by the *US News and World Report* (USNWR) in 1983, did LTRS begin to play a large role in the American higher education system (Salmi and Saroyan, 2007).

[10] Results and detailed methodology available at http://colleges.usnews.rankingsandreviews.com/best-colleges.

The concept of HEI rankings was quickly emulated by other countries, and LTRS have become an important aspect of the world's higher education landscape (Usher and Savino, 2006). The creation of national-level LTRS is a growing international trend (King, 2009). Such LTRS are now present in at least 40 countries (IHEP, 2009). However, the geographic distribution is still generally limited to countries with larger and more developed higher education systems (Salmi and Saroyan, 2007). The EU/EFTA region is well represented in regards to national LTRS. Rankings have been implemented in Austria, France, Germany, Ireland, Italy, the Netherlands, Poland, Romania, Slovakia, Spain, Switzerland, and the UK.[11]

As was seen in Chapter 2, globalization and internationalization are now at the forefront of many discussions about higher education. The pressures of globalization, along with the increased costs related to the massification of higher education occurring in many countries, has prompted governments to increase the market elements and competition in their higher education systems (Dill, 2006). Those trends contribute to demands for consumer-friendly information about the relative academic quality of HEIs (Dill and Soo, 2004). This created a ripe environment for the rapid rise of national LTRS (Dill, 2007; Salmi and Saroyan, 2007). Such LTRS can be seen not only as a result of increased competition in higher education, but increasingly LTRS are a major driving force behind that competition (Federkeil, 2008).

3.2.2 Rise of Global League Tables and Ranking Systems

Globalization has led to an environment in which higher education markets are increasingly global rather than national (Beerkens, 2004). This global competition, combined with the increased international mobility of students and academic staff, has resulted in the need for more transparent information regarding institutional quality on a worldwide rather than national basis. As a result, the creation of international and global LTRS was the next logical step in the evolution of rankings (van der Wende, 2008).

In 1997, *Asiaweek* magazine created what is considered the first notable international LTRS, when it began ranking Asian HEIs. The magazine soon met with resistance, and in 1999, 35 universities, including the top-ranked University of Tokyo, boycotted the project's data collection, effectively ending the rankings (Salmi and Saroyan, 2007). However, it is the recent establishment of two LTRS which attempt to evaluate HEIs on a worldwide basis that began the truly global dimension of the ranking phenomenon (Usher and Savino, 2006).

[11] See list of countries with LTRS at the Institute for Higher Education Policy's (IHEP) Ranking Systems Clearinghouse http://www.ihep.org/Research/nationalrankingsystems.cfm last accessed September 24, 2009.

The *Academic Ranking of World Universities*[12] was established by Shanghai Jiaotong University (SJTU) in 2003. The SJTU project was started as a benchmarking initiative to measure the standing of Chinese HEIs compared to 'world-class universities' (Liu and Cheng, 2005). The system is based primarily upon research output, as the system's designers felt this was the only HEI activity that could be compared globally and was the area in which the designers wanted to benchmark Chinese HEIs (Liu and Cheng, 2005).

The Times Higher Education Supplement began publishing a global LTRS in 2004 that is now known as the *Times Higher Education - QS World University Rankings*[13] (THE-QS). Unlike the SJTU system, THE-QS attempts to be a more comprehensive evaluation of HEIs, and research performance is a secondary indicator in the system. In an attempt to measure other aspects of HEI performance, the THE-QS designers based their system primarily upon institutional reputation, as well as input measurements such as student to staff ratios and the percentages of international students and staff at the HEI (THE-QS, 2008).

The growing importance of international competition in higher education contributed to the rise of these global LTRS (Marginson and van der Wende, 2007b). While several competing systems have been created, SJTU and THE-QS have generated the most response and remain the most influential (van der Wende, 2008). Those two global LTRS have quickly become important factors in many higher education discourses and have been met with "almost instantaneous and universal endorsement and obsession (Hazelkorn, 2009, pg. 49)." The level of attention and controversy they have generated is a clear sign of the increasing global competition in higher education (Federkeil, 2008). King also argues that global LTRS have become "significant market participants almost irrespective of the scientific validity of their approaches (King, 2009, pg. 212)." Despite concerns regarding their validity, global LTRS, have likely become permanent aspects of the world's higher education landscape.

3.3 Criticisms of League Tables and Ranking Systems

Although LTRS are playing a very visible national and international role, they have also had many critics. Researchers have questioned methodologies employed in many LTRS and also sought to determine their impacts on policy making and institutional behavior (Marginson and van der Wende, 2007b). Hazelkorn identified three main areas of concern (2008). Firstly, many LTRS are criticized for their holistic evaluation of HEIs and for using the same criteria

[12] Results and detailed methodology available at http://www.arwu.org/.
[13] Results and detailed methodology available at http://www.topuniversities.com/worlduniversityrankings/.

to evaluate all HEIs despite their wide-ranging missions, goals and operating environments. Secondly, some question the choice of indicators, assigned weightings, and the suitability of those choices as measurements of institutional quality. Lastly observers have questioned the actual value of LTRS as providers of information to higher education's consumers.

3.3.1 Methodological Shortcomings of LTRS

Numerous observers question the validity of LTRS and the methodologies adopted. Many LTRS currently in place have indicators and weightings that seem more representative of publisher choice than theoretical grounding (Eccles, 2002; Stensaker and Kehm, 2009; van der Wende, 2008). Some have implemented insufficient data verification procedures (Stensaker and Kehm, 2009). Most LTRS have few if any valid measurements of teaching and learning and thus often favor research-intensive HEIs (Marginson and van der Wende, 2007b). Some LTRS are largely based upon questionable reputational measures which may be influenced by past results in the same rankings (van der Wende, 2008).

Most LTRS use a weighted system of indicators to create a composite indicator which is used to rank order HEIs (Usher and Savino, 2006). Furthermore, most LTRS employ a unique combination of indicators with little consensus about what constitutes measurable academic quality (Usher and Savino, 2006). Some observers feel the majority of current LTRS are not theoretically grounded in their methodologies and simply choose indicators based upon easily available data (Federkeil, 2008). Thus, many LTRS focus on input indicators (e.g. student/faculty ratios, faculty salaries, and research productivity) despite evidence that these measurements have minimal if any relationship to student learning outcomes (Dill, 2006).

In addition to input measurements, many LTRS rely heavily on reputational indicators focused on the institutional rather than departmental or disciplinary level (Federkeil, 2009). As LTRS likely contribute to academic reputation, there is concern about possible circular effects of using such indicators (Federkeil, 2009). In other words, an HEI's standing in a current year's LTRS may affect their standing in a future year, since those surveyed are likely at least aware of the relative rank of HEIs. There is also concern that LTRS make institutional reputation more important than individual departments (Marginson, 2009). As a result, departments within HEIs benefit from the reputation of the HEI as a whole. This departmental reputational advantage is not always deserved as is evident from results from the *CHE*

University Ranking[14] in Germany. Those results have shown that departments in the same HEI and from very similar disciplines often show large differences in reputation (Federkeil, 2009). In addition, the choice of which individuals to include in a reputational survey can greatly impact the results. This is particularly true when results are aggregated to the institutional level, and when creating international or global LTRS (Federkeil, 2009).

By focusing on the institutional level, LTRS can create a 'halo effect' for all departments at well-ranked HEIs. Dramatic examples of this effect include a survey of employers in Germany which ranked the University of Heidelberg as having a top-6 business program, and in the US where a similar survey ranked Princeton as having a top-10 law program. However, neither university actually had such a program (Federkeil, 2009; Marginson and van der Wende, 2007b). Focusing on institutional reputation can also have the opposite affect, where pockets of high quality programs and departments in lower ranked HEIs can struggle to gain the reputation they deserve due to the poor standing of their overall institution.

Based on the methodological criticisms received, clearly LTRS creators have struggled with the same difficulties in measuring institutional quality as governmental initiatives. Yet, while those initiatives also often obtain questionable results, those results are not as easily accessible to the public. Thus, in the minds of many stakeholders, LTRS have become a proxy for overall institutional quality, including teaching quality, even when valid teaching and learning measurements are not included (Marginson and van der Wende, 2007b).

3.3.2 Limited Usefulness for Stakeholders

While LTRS are increasingly utilized by a wide range of stakeholders, most systems, particularly at the national level were designed primarily to help guide student choice. However, the predominant focus on input, reputation and research indicators has led some to question their usefulness to students, who would likely be better served by departmental evaluations based more on learning outcomes (Dill and Soo, 2004). While some, such as the USNWR, caution users to only use LTRS performance as one aspect in their choice process, and to look closely at underlying data, it is expected that many students simply look at overall rank (Dahlin-Brown, 2005). Those ranks often exaggerate small differences in performance, and as a result can be misleading to students (Longden and Yorke, 2009).

[14] Results and detailed methodology available at http://ranking.zeit.de/che10/CHE_en.

Students and other stakeholders are made up of diverse groups with differing opinions and needs regarding evaluations of academic quality and reputation, such as those provided by LTRS (Federkeil, 2009). However, most LTRS have a fixed combination of indicators and weightings which reflect the ranker's opinion of what represents academic quality. These opinions provide a single view and do not match the needs of all users (Cremonini, Westerheijden and Enders, 2008). Many national LTRS are based primarily on the perceived needs of current high school graduates seeking to enter undergraduate education. As a result, the needs of other student groups such as graduate or international students are not reflected. In addition, LTRS often reflect the norms of what represents academic quality for only a specific cultural and social group (Cremonini, Westerheijden and Enders, 2008). Other groups may value the indicators of a given LTRS differently, but since indicators and weighting in most LTRS are not customizable, the choices made by the rankers are in effect final for all users (Cremonini, Westerheijden and Enders, 2008). This is particularly important in the very diverse social and cultural context of the international student market.

3.3.3 Criticisms of Global LTRS

Global LTRS have been the subject of criticism since their introduction. While some acknowledge the difficulty of finding good indicators for academic quality in a global context (HEFCE, 2008), others feel that both SJTU and THE-QS chose to focus on easily obtainable indicators (McCormick, 2008). Both systems lack indicators for evaluating teaching and learning. However, to many LTRS consumers, the global rank of an individual HEI comes to signify institutional quality as a whole, not just the aspects measured (Federkeil, 2008). Both LTRS have also been criticized as biased in favor of large research-intensive HEIs in English-speaking countries (Marginson and van der Wende, 2007b).

The THE-QS rankings are seen as less methodologically rigorous than the SJTU system (Marginson, 2009). The primary criticism of THE-QS is its emphasis on reputational surveys. Many doubt whether those surveyed are truly qualified to judge the quality of entire institutions and disciplines; as a result respondents may simply rely on ideas of past reputation (van der Wende, 2008). Additional concerns are raised by the fact that the reputational survey has very low response rates (only 1% in 2006) (van der Wende, 2008). The fact that the THE-QS does not reveal actual response rates, or the national or disciplinary makeup of the returned surveys, raises concerns about possible sampling biases (Federkeil, 2009). No efforts are made to correct such a possible bias. As a result, some feel the results are partial to the UK

and former British colonies such as Australia and New Zealand where *Times Higher Education* is more widely known and read (Marginson, 2009).

The SJTU system is more transparent in regards to its methodology. Thus, the system is considered credible, and has gained greater influence within academic and policy making circles (van der Wende, 2008). The primary criticisms towards SJTU are not related to its methodology, but instead to how its results are used. The SJTU rankings only measure research performance. However, in the eyes of many, the rankings have come to be associated with overall institutional quality, including teaching and learning (van der Wende, 2008).

3.3.4 Concluding Remarks

Despite concerns regarding their methodology and validity as tools to help guide student choice, LTRS have become models of institutional quality. In effect, LTRS have become scorecards in a 'rankings game' where institutional prestige can be won or lost depending on how well HEIs participate. In this zero-sum game HEIs compete to improve their relative standing in national and global LTRS, and in turn institutional prestige. While prestige maximization has likely always been a part of higher education, LTRS have clearly added another dimension. In the past prestige was built slowly and sometimes imperceptibly. LTRS, which are predominantly produced on a yearly basis, provide incentives for HEIs to consider initiatives that can result in short-term gains in rank, but may have long-term consequences (CPB/CHEPS, 2001). These incentives are further exacerbated by the manner in which most LTRS focus on holistic and ordinal rankings of HEIs, often without regard for statistically significant differences. This element of LTRS has contributed to a shift in the ideas of prestige away from past concepts often based upon departmental quality and/or informal groupings of HEIs. By adding a quantifiable dimension to measuring prestige, LTRS foster an environment in which HEIs must increasingly participate in what Dill calls an "academic arms race for prestige (2007, pg. 67)." The next section examines some of the ways the higher education community has responded to that arms race.

3.4 Responses to League Tables and Ranking Systems

The higher education community has gone through a series of transitions in its consensus opinion toward LTRS. This has moved from general contempt regarding the very concept of ranking HEIs, to grudging acceptance of the inevitability of LTRS. In recent years the community seems to see potential value in LTRS. Thus, instead of rejecting LTRS outright,

the community is working to be more directly involved to help improve existing LTRS and to foster creation of methodologically sound systems in the future (Sadlak, 2007). An example of this new philosophy can be seen in the creation of the International Rankings Expert Group (IREG) in 2004 by the UNESCO European Centre for Higher Education (UNESCO-CEPES) and the Institute for Higher Education Policy (IHEP). The group evolved in 2008 to the IREG-International Observatory for Academic Ranking and Excellence (Sadlak, Merisotis and Liu, 2008). The group includes members of ranking organizations, academics, researchers and others that use LTRS. The group holds annual meetings to discuss problems and propose solutions surrounding the LTRS phenomenon. This group was responsible for creation of the *Berlin Principles on Ranking of Higher Education Institutions*[15] in 2006, which outline 16 best practice guidelines designed to help improve the inherent deficiencies in many existing LTRS, as well to provide a template for the creation of more responsible LTRS in the future (Sadlak, Merisotis and Liu, 2008).

Part of the impetus for the creation of IREG and the *Berlin Principles* is the impacts both positive and negative that have been observed from the recent LTRS phenomenon. Hindering wider student access, favoring research over teaching, and concentrating research funding in a few select HEIs to the potential detriment of a system as whole, are among the noted negative impacts fostered by many LTRS (IHEP, 2009). Moreover, LTRS have impacted higher education policy at both institutional and governmental levels. In addition, the influence of LTRS has moved beyond the student and HEI levels, and is having a growing impact on public opinion, governments, employers, philanthropy and industry (Marginson and van der Wende, 2007b). Governments in particular seem to be less influenced by national than global LTRS (Hazelkorn, 2009), which "quickly became the meta-performance indicator (Marginson, 2009, pg. 27)" soon after being introduced. Numerous countries have instituted policies and programs to help increase their number of highly ranked HEIs (King, 2009) as a "symbol of national achievement and prestige and as engines of economic growth in a global knowledge economy (Marginson and van der Wende, 2007b, pg. 309)."

3.4.1 EU and European National Level Impacts

Global LTRS have led to policy discussions in national and supra-national European contexts (Dill, 2006). As an example, the low standing of Continental European HEIs in the THE-QS and SJTU rankings, and concerns that European systems are 'lagging behind,' has generated

[15] More information about IREG and the Berlin principles can be found at http://www.ireg-observatory.org.

higher education policy debates at both national and EU levels (Marginson and van der Wende, 2007b). Such debates have resulted in policy reforms designed to help individual HEIs develop into institutions that meet the ideas of a 'world-class' university'. Those ideas are being largely shaped by global LTRS (Deem, Mok and Lucas, 2008). This idea of 'world class' universities was a component in a 2005 communication from the European Commission regarding the role of HEIs in the Lisbon Strategy (EC, 2005). This communication referenced the standing of continental European HEIs in the SJTU rankings and can be seen as a direct response to the rise of global LTRS. In addition some European politicians have set goals for the number of HEIs within a country that will be ranked in various tiers of global LTRS, particularly SJTU, by a certain date (van der Wende, 2008).

While the long-term results of these policy debates are still being determined, examples of the impacts of global LTRS on European higher education systems have started to emerge. One area is in regards to institutional mergers. The SJTU and THE-QS global LTRS are biased towards larger research-intensive HEIs (Salmi and Saroyan, 2007). This creates incentives for mergers between smaller HEIs, and between HEIs and other organizations, such as research centers and hospitals, to create larger entities with increased research productivity that can perform better in those rankings (Hazelkorn, 2009). This is at least part of the rationale behind plans being formulated in Denmark, Finland, France and the Netherlands to merge institutions (Marginson and van der Wende, 2007b; Salmi and Saroyan, 2007; Siganos, 2008).

A second area where the impact of global LTRS can be seen is in regards to changes to the funding arrangements for higher education, particularly for university-based research. This has included a call for increased public and private investment in higher education and R&D (Marginson, 2009). LTRS increasingly play a growing role in the allocation of research funding (Marginson, 2009). Countries are seeking to enhance research productivity, at least in the eyes of global LTRS, by focusing on publication in English rather than local language journals and through the concentration of research funding (Deem, Mok and Lucas, 2008). This governmental use of more concentrated funding at particular HEIs in order to create 'centers of excellence' to facilitate a rise in the THE-QS and SJTU rankings (Marginson, 2009) can be seen in countries such as France and Germany (King, 2009).

In a European context, this represents a move away from the relatively egalitarian funding that has been a hallmark of many higher education systems in the region. In Germany, the *Exzellenzinitiative* was established in 2005 to identify and financially reward the best research

HEIs to help them become more ‘elite institutions’ (van der Wende, 2008). This represents a dramatic shift, as the country has traditionally spread research capacity fairly evenly among HEIs. The effects of this past distribution can be seen in how well the country’s HEIs are represented in the top 500 institutions in the 2005 SJTU rankings in relation to their share of world economic capacity (Marginson and van der Wende, 2007b). However, that spread of capacity was also seen in the poor standing of German HEIs in the top 100 of the same year’s rankings. Hazelkorn considers the *Exzellenzinitiative* to be principally a response to global LTRS, rather than domestic LTRS, such as the *CHE University Ranking* (2009). Only time will tell if the initiative will result in increased research capacity in the German system overall, or merely a shift of resources, with minimal or no gains in system-level capacity.

France perhaps represents the European country that feels most affected by the standing of its HEIs in the SJTU and THE-QS systems. Each year after the new rankings are released, French press is filled with commentaries about the relative poor standing of French HEIs. President Sarkozy has called for changes to bring two French HEIs into the top 20 and ten into the top 100 of the SJTU rankings by 2012 (Siganos, 2008). This compares to zero and three respectively in the 2008 SJTU rankings. One way this may occur is through mergers to create institutions of sufficient size to gain a higher rank. However, there are concerns that these mergers will be more symbolic than substantive (Siganos, 2008). The first will be the scheduled merger of three universities in Strasbourg in 2009. Once these mergers occur, and if they are recognized by SJTU and THE-QS, this will raise the question of whether LTRS are actually ranking real universities or simply symbolic groupings of HEIs (Siganos, 2008).

Also under consideration are modifications to the French higher education system. That system includes the elite Grandes écoles, which are primarily professional schools that conduct minimal research, yet attract the best qualified students (Siganos, 2008). In contrast, universities have an open access policy requiring acceptance of all secondary school graduates. In addition, universities engage in minimal competition and are treated equally in regards to funding and academic staff appointments. Thus, less stratification is seen relative to the US and UK, and few French HEIs have a concentration of resources and capacity to rank highly in global LTRS (Salmi and Saroyan, 2007). The modifications being considered would increase competition among universities for both students and funding, and potentially allow some universities to engage in more selective admissions procedures (Siganos, 2008).

In addition to making changes to become a better player in the global rankings game, France has worked to potentially change the nature of the playing field by creating a different international rankings game. France placed an emphasis on higher education quality assurance in Europe during the period of its EU presidency in the second half of 2008. One result of their activities was a proposal for a European-led LTRS as a response to SJTU and THE-QS. This culminated in a call for tenders in October 2008 for the "Design and testing the feasibility of a Multi-dimensional Global University Ranking"[16] from the European Commission. The contract for the two-year project was awarded in June 2009 to the Consortium for Higher Education and Research Performance Assessment (CHERPA)[17] which is made up of leading European research centers in the field of LTRS (CHE, 2009).

3.4.2 Institutional Level

The results in various LTRS are also closely examined at institutional levels. According to Hazelkorn, "rankings have affected all HEIs" and "even HEIs which are not globally ranked are affected/infected by the rankings obsession (2009, pg. 50 & pg. 66)." At the institutional level, LTRS are encouraging curriculum changes, increased numbers of graduate programs and scholarly publication in English, and the reallocation of funding and resources towards research (Hazelkorn, 2009). The results of the two recent studies discussed below provide more details of the influence and impact LTRS are having at the institutional level.

Hazelkorn's study, sponsored by the OECD, sought to examine the role of LTRS in institutional behavior and decision-making. The study included responses from academic leaders and senior administrators at 202 institutions in 41 countries (2007). The study included a wide range of intuitional types, including both research and teaching-focused HEIs. Over half of the responses were from European countries. Overall, the majority of respondents were unhappy with their HEI's current standing in both national and global LTRS, with 93% wishing to improve their standing in national LTRS and 70% aspiring to be in the top 10%. A further 82% wished to improve their global LTRS standing, and 71% wished to be in the top 25%. While most respondents questioned the methodology of existing LTRS, almost half used their standing for marketing and publicity. Most monitor the status of other HEIs, both nationally and internationally, and many consider institutional rank when evaluating academic and research partnerships, staff and student exchanges, and incoming students and staff. Considering the obvious importance respondents have placed on LTRS, it

[16] The tender information can be read at http://ec.europa.eu/education/programmes/calls/3608/index_en.html.
[17] Information on CHERPA can be found at http://www.che-concept.de/cms/?getObject=302&getNewsID=983.

is not surprising that over half also noted their HEI had established formal procedures to review their LTRS standing and had taken strategic actions based on LTRS results.

The Higher Education Funding Council for England (HEFCE) funded a similar study. That study included responses from 91 HEIs in England distributed among various intuitional types (2008). The study found national rather than global LTRS were seen as more influential by respondents. Similar to Hazelkorn's study, most respondents were unhappy with their current rank, with only 2% feeling their HEI should be ranked lower and 93% noting some level of importance at achieving good LTRS results. In addition, 59% felt behavior in higher education is influenced by LTRS. In an open question, only five respondents stated their HEI had not taken action in response to LTRS. The most commonly cited areas of change were in regards to marketing and media relations. It is worth noting that the fourth most cited area of change was to teaching and learning activities, of which 55% of respondents stated their HEI had experienced at least moderate change as the result of LTRS. Also similar to the Hazelkorn study, almost half had established programs to analyze their LTRS standing and were making strategic plans as the result of LTRS performance. LTRS had also led 13% of responding HEIs to take undesired strategic actions in response to LTRS.

While more research needs to be done to truly understand the impact LTRS are having on HEI behavior and decision-making, these studies give early indication that the impacts may be substantial. In particular, despite methodological concerns, many HEIs seem to believe LTRS are taken seriously by external stakeholders, particularly students as discussed below. However, if HEIs are judged or believe they are judged by these stakeholders on the basis of their rank in various LTRS, a strong incentive is created for HEIs to make changes in order to better match what is being ranked. If criteria used in LTRS overly emphasize one of the three primary functions of higher education (see Mora and Vila, 2003), such as research, this creates a risk that HEIs will also emphasize that function, possibly at the expense of teaching and service to society (Marginson and van der Wende, 2007b).

While the relative importance placed on each primary function varies with time and between institutions, the ways in which societies define and reward institutional quality affects how HEIs allocate their available resources (Winston, 1999). Defining academic quality has always been a challenging endeavor, and when one function is easier to evaluate, efforts are often invested in that direction (CPB/CHEPS, 2001). The relative ease of measuring research performance is at least partially responsible for the predominant reward structure in higher

education, which is focused more towards research productivity than teaching performance (CPB/CHEPS, 2001). This ease of measurement is also behind the choice of research-based indicators in many national and global LTRS. Yet, when incentives to individual academics from this reward structure (James, 1990) and the significant institutional incentives from many LTRS for HEIs to become more research focused are combined, there is a strong risk that research will become even more dominant than the teaching and service functions of HEIs. Higher education has traditionally relied on a widely accepted 'code of conduct' to avoid overly emphasizing any primary function (Jongbloed, 2004). However, only time will tell if this will be adequate to retain a balance between the three primary functions in today's higher education landscape increasingly influenced by research-based LTRS.

3.4.3 Competition and Institutional Perceptions on Role of LTRS in Student Choice

Higher education can be considered a prime example of an industry that is reliant on a customer-input technology (Winston, 1999). Students at a HEI are not only customers, but also important aspects of the institution's educational production, and in the case of graduate students, research production (Teixeira et al., 2004). Hence, education and research quality at a particular HEI are partially related to the capability of the institution's students (Winston, 1999). The quality of an HEI's students is also an important factor in the institution's capacity to attract similar students, as well as higher caliber academic staff (Jongbloed, 2003). Thus, HEIs have a strong incentive to maximize the quality of their student population. This incentive is compounded by the use of student quality indicators in some national LTRS (e.g. USNWR, Maclean's, Guardian). One of the ways HEIs ensure incoming student quality is by creating excess demand, which allows them to select preferred students from all applicants. In most cases HEIs with better reputations are more able to recruit and select top students, which helps ensure their continued academic and research productivity (Horta, 2009). The studies discussed below show that higher education leadership often feel reputation, particularly in the eyes of students, is highly influenced by LTRS, which in turn influence student choice.

In the Hazelkorn study mentioned previously, respondents were asked about the influence they think LTRS have on students (2007). Over 70% felt LTRS had been mostly created to provide students with comparative information (Hazelkorn, 2008). Respondents also felt students were the stakeholder group most influenced by LTRS (Hazelkorn, 2007). The consensus was that LTRS are influential in student choice, particularly in the case of high achieving, graduate and international students (Hazelkorn, 2008).

The HEFCE study also examined institutional opinions regarding the use of LTRS by students in England (2008). Student recruitment was considered the 2nd most influenced area by LTRS (91%). In addition, the area cited most frequently by respondents, general reputation of the HEI (95%), likely also plays a role in student recruitment. Case studies conducted at different types of HEIs indicated LTRS are seen by respondents as more likely to be used by traditional age undergraduate, high achieving, higher social status, and graduate students. There was also agreement that LTRS are increasingly used by international students, who use national and global LTRS to compensate for having less tacit knowledge of English HEIs.

Similar results have been found in other studies. A study of 135 administrators and professors at 50 law schools in the US found a strong belief that student choice is highly affected by LTRS (Sauder and Lancaster, 2006). Rolfe's study at four post- and pre-1992 universities in the UK also found university managers believed student choice was heavily influenced by LTRS (2003). National case studies have also revealed beliefs among respondents at HEIs that LTRS are more influential to certain groups: higher achieving students in Germany (IHEP, 2009); international students in Australia and Canada (Hazelkorn, 2009; IHEP, 2009). These studies demonstrate that in many contexts higher education leaders believe LTRS are highly influential in student choice, particularly to high achievers and international students.

3.4.4 Concluding Remarks

While research on the impacts of LTRS is still rather limited, the studies presented above give an early indication that their influence is substantial. Governments and individual HEIs are enacting changes that can be at least partially be traced to the growing influence of both national and global LTRS. Not least among these influences is the perception among some in higher education leadership that LTRS are having a considerable impact on student choice, particularly among graduate and international students. However, as discussed in Chapter 5, limited research has taken place to confirm those beliefs. In particular, there is minimal evidence to support the beliefs among some in higher education leadership that LTRS are more influential to international and graduate students.

The lack of evidence regarding the role of LTRS in student choice does not seem to have had an effect on those perceptions. HEIs, often market their standing in both national and global LTRS, including to international students (Salmi and Saroyan, 2007). Recruitment of such students is a key strategy at many HEIs, with some doing so for the benefits of additional revenues through differential tuition fees (King, 2009). Other HEIs recruit international

graduate students to help ensure future research productivity, and in turn their LTRS standing (Horta, 2009). While the number of international students is expected to increase significantly in coming years, competition for them remains fierce and is expected to intensify further as more countries and HEIs seek to increase their international student enrollments (Marginson and van der Wende, 2007a). Some observers expect that as this competition increases, LTRS may be even more influential to institutional behavior (HEFCE, 2008).

3.5 Conclusions and an Alternative Future for LTRS

Even before the rise of LTRS discussed in this chapter, a tacit hierarchy of academic quality existed in both national and international contexts (Stensaker and Kehm, 2009). LTRS can be seen as attempts to make that hierarchy more evidence-based and explicit to a wider range of stakeholders. Rapidly increasing worldwide higher education enrollments, coupled with the pressures of globalization and the efforts of national and supra-national governments to foster more knowledge-based economies, have created a ripe environment for the rise of LTRS.

King argues that global LTRS are important regardless of their actual effectiveness at measuring the relative quality of HEIs. As he states, LTRS are useful for "providing some sense of global orderliness and providing additional support for the operation of global markets and global reputation sifting in higher education (King, 2009, pg. 212)." In other words, global LTRS are necessary to facilitate the continued rapid growth in international aspects of higher education. That growth has created a need for comparative information regarding HEIs. Although existing global LTRS may be poor measurements of academic quality, they at least provide a heuristic device upon which multiple stakeholders can base their decisions in an evermore complex and global higher education environment.

International and national-level competition in higher education continues to intensify as more market elements are introduced into many higher education systems. Existing LTRS contribute to that increased competition (King, 2009), and in turn that increased competition will likely lead to the development of new LTRS (Stensaker and Kehm, 2009). As a result, it is important to develop new LTRS, and to foster changes in existing systems, that better reflect the needs of higher education stakeholders. As an example, many existing LTRS are based on assumptions of what is important to student decision-making. However, minimal research has been conducted to confirm those assumptions, or to investigate how students use LTRS (Stensaker and Kehm, 2009). Additionally, many LTRS are based on holistic fixed

views of HEIs based primarily on input, reputational, and/or research-based indicators which may not provide the information students need to make effective choices (Dill, 2006).

An example of an alternative type of LTRS can be seen in Germany where a ranking system developed by the Center for Higher Education Development (CHE)[18] provides what is widely considered a 'best practice' ranking. The *CHE University Ranking*[19] philosophy forgoes the holistic rank-ordered nature of most existing national and global LTRS. It instead focuses on the discipline and department levels using quality groupings rather than ranks. In addition, rather than creating an overall score through arbitrary and fixed use of weightings, the *CHE University Ranking* results are available on the Internet, in order to allow users to chose their own weightings for the indicators to create their own personal definition of academic quality.

Although originally developed for a German specific LTRS, the CHE philosophy is being extended internationally. The *CHE University Ranking* has been extended to Austria, the Netherlands, and Switzerland. Also the introduction of a "Ranking of Excellent European Graduate Programmes" (i.e. *CHE ExcellenceRanking)*[20] in 2007 expanded the CHE philosophy to the European level. That project's goal is to help potential graduate students find excellent programs to pursue master and doctoral study. The first round of the project included biology, chemistry, mathematics and physics. In 2009, the second round evaluated economics, political science, and psychology. In addition, the CHE philosophy is being brought to the global level as the organization is one of two lead partners in the CHERPA initiative selected by the European Commission to create a multi-dimensional global ranking.

This spreading of the CHE philosophy beyond Germany likely represents a positive step forward in the rankings industry. As noted by Usher and Medow in their review of LTRS throughout the world, "The biggest difference between rankers is philosophical; traditional rankings with weightings aggregation by definition are trying to find an institution which can be called 'the best'; CHE-style rankers are using the power of the internet to help consumers find the institutions that is 'best for them' (Usher and Medow, 2009, pg. 16)." As a result, the spread of CHE-style LTRS to other national, regional and global contexts will likely provide students and other stakeholders with better decision-making tools.

[18] More information about the CHE and its various rankings projects can be found at http://www.che.de/.
[19] Results and detailed methodology available at http://ranking.zeit.de/che9/CHE_en.
[20] Results and detailed methodology available at http://www.excellenceranking.org/.

Chapter 4: Theoretical Background: Student Choice Models

Hossler, Braxton and Coopersmith define “student college choice” (hereafter student choice) as “a complex, multistage process during which an individual develops aspirations to continue formal education beyond high school, followed later by a decision to attend a specific college, university or institution of advanced vocational training (1989, pg. 234).” While the authors make reference to “high school”, as can be seen in the models reviewed in this chapter, other researchers have adapted “aspirations” to refer to ambitions to attend graduate school, or to study internationally. A key dimension to the author’s definition to consider in the context of this study is the concept that student choice is not simply the selection of a HEI, but also the other choices and actions that culminates in that selection. As a result, student choice is “best understood as a process, which requires different variables at different times as the student moves from predisposition to search to choice (Hossler, Schmit and Vesper, 1999, pg. 155).”

While some early research was conducted in the US in the 1920s (Kinzie et al., 2004), student choice became a noteworthy area of research, at least in domestic undergraduate student contexts, with the establishment of several theoretical models in the 1980s which are still influential today (see Chapman, 1981; Hossler and Gallagher, 1987; Jackson, 1982; Litten, 1982). While undergraduate student choice remains a common research topic in Australia, the Netherlands, the UK and the US (Vossensteyn, 2005), much less theoretical work has been done to understand the decision-making process of graduate or international students. This scarcity of research is somewhat surprising considering the worldwide scope of student mobility and the increased competition to attract international students. This lack of research can possibly be traced to inherent difficulties in studying decision-making among a socially and culturally diverse group such as international students. A few researchers have attempted to study and model international student choice, most notably by employing ‘push-pull’ theory (e.g. Chen, 2007b; Mazzarol and Soutar, 2002; McMahon, 1992; Wit et al., 2008).

While international student choice represents a very under-researched area, graduate students within that population have received even less attention. In addition, very little research has taken place in any context to understand the role and use of LTRS in student decision-making. As a result, in order to provide a general theoretical understanding of student choice, this chapter presents several models, including undergraduate and general international student choice models. The first section examines models developed in the 1980s which influenced the development of later choice models, including the frameworks created to understand

international student decision-making which are presented in the second section. As this is an exploratory study into the role of LTRS in international graduate student choice utilizing data from an existing survey instrument, a specific theoretical framework was not established. However, the frameworks presented served as conceptual guides to understanding the overall student decision-making process and the role LTRS may play in that context.

4.1 General Student Choice Models

In their detailed student choice literature review, Hossler, Braxton and Coopersmith found that the theoretical models developed for understanding student decision-making were primarily rooted in three approaches: econometric, status attainment, and models that combine those two (1989). A decade later, Hossler, Schmit, and Vesper found economic and status-attainment models were still influential and that the combined models had begun to integrate more information-processing theory (1999). Perna in her recent literature review found status-attainment models had evolved to incorporate more social and cultural theories, and should now be categorized as sociological/cultural models (2006). She also noted that since 1990, there has been an increasing amount of qualitative as well as the traditional quantitative approaches to understanding student choice. However, she also found that while research on other student groups is slowly growing, most existing studies have focused on traditional-age students making the transition from high school to higher education (Perna, 2006).

Regardless of the approach taken to understand student choice, the consensus is that it involves a highly complex multi-stage process including many variables that influence decision-making in each stage. This section introduces the three primary approaches with a focus on three influential combined models which served as a base for the model of international graduate student choice that closes this chapter.

4.1.1 Economic or Econometric Models

Early economic college choice models were based on the idea that students behave rationally and have the capability to evaluate information effectively, such as through a cost-benefit analysis, in order to determine the advantages and disadvantages of different higher education options, in order to maximize their individual utility (Hossler, Schmit and Vesper, 1999). Perna's review showed these models have evolved since the 1980s and are no longer completely based on rational behavior and perfect information assumptions, but rather on ideas that students utilize what information is available (2006). She also noted these models

are very much rooted in human capital theory. In this theory, undertaking higher education can be seen as an investment in an individual's human capital which raises their productivity and in turn their earning potential (Becker, 1993).

Economic models mostly focus on how students from different backgrounds (e.g. parental income and/or education, academic ability of self and peers, gender) vary in their valuation of financial variables involved in student choice (e.g. tuition costs, lost earnings, future earnings impacts) (Hossler, Schmit and Vesper, 1999). The models focus on decision-making and how students differ in their use of information regarding the benefits of attending higher education or a particular HEI (Hossler, Schmit and Vesper, 1999). Research has shown potential students have varying levels of ability to access and understand information (Perna, 2006). This is further complicated by the fact that information asymmetries are common in markets offering 'experience goods', such as higher education, where a good's true value cannot be accurately judged until after purchasing and completing the experience (Jongbloed, 2004). As a result, students may not have a complete understanding of their options or the costs and benefits related to higher education, and consequently may overestimate those costs but underestimate impacts on future earnings (Perna, 2006). This is particularly true among certain student groups, notably those from lower income backgrounds (Perna, 2006).

A typical example of an economic model is one proposed in 1985 by Kotler and Fox (Hossler, Schmit and Vesper, 1999). Their model is rooted in risk reduction theory (Hossler, Schmit and Vesper, 1999) and includes four stages: need arousal, information gathering, decision evaluation, and decision execution (cited in Hossler, Braxton and Coopersmith, 1989). The authors suggested the information gathering stage is the most important in terms of institutional image, since students create impressions of HEIs based on information they discover, even if that information is incomplete or inaccurate (cited in Hossler, Braxton and Coopersmith, 1989). This finding is particularly relevant in an LTRS context as students who use them in their information gathering stage may not realize that, as discussed previously, such rankings often include incomplete or misleading representations of institutional quality.

Economic models are most useful for having introduced decision-making and human capital production perspectives, as well as a focus on financial variables associated with higher education, to models of student choice (Perna, 2006). However, these models primarily focus on single stages, particularly the final stage, and as a result do not model student choice as a continual process (Hossler, Braxton and Coopersmith, 1989; Perna, 2006). These models also

do not sufficiently account for all variations in choice behavior among different student groups, notably family income and racial/ethnic groups (Perna, 2006). As a result, economic models are not useful across a wide range of student choice contexts (Perna, 2006).

4.1.2 Status-Attainment or Sociological-Cultural Models

Early status-attainment models were based on assumptions of interactions between behavioral variables (e.g. academic ability, performance and motivation) and background variables (e.g. socio-economic status, influence of family/peers, high school environment) influencing an individual's aspiration to attend higher education (Hossler, Schmit and Vesper, 1999). Perna argues that research in this area has evolved beyond status-attainment models developed in the 1970s and 1980s, and now focuses more on the concepts of social and cultural capital (2006). Similarly to human capital, social and cultural capital aid an individual's productivity and upward mobility (Perna, 2006). More recent studies have focused on how student aspirations and choices are influenced by their habitus (Perna, 2006). Those models do not see student choice as resulting from rational analysis, as in economic models, but instead as reasonable choices given the social and cultural contexts of individual students (Perna, 2006).

Status-attainment and sociological-cultural models are more flexible than economic models, and allow for exploring student choice among wider groups (Perna, 2006). These models also brought the concepts of interacting variables, whose influence can change and vary over time, to student choice research (Hossler, Schmit and Vesper, 1999). However, they are limited in their full understanding of student choice by the fact they are primarily focused on the aspiration stage (Hossler, Braxton and Coopersmith, 1989) and as a result do not offer complete frameworks for understanding other stages in student choice (Perna, 2006).

4.1.3 Combined Models

While economic and status-attainment/sociological-cultural models provide useful tools for understanding specific aspects of student choice, they do not provide complete explanations of the full process. This has led numerous researchers to integrate elements from each method to create "combined models" (Hossler, Braxton and Coopersmith, 1989). These combined models have the benefit of being able to select elements and variables from other models that work best, while being freed from some of their constraints and weaknesses. Perhaps the most useful aspect of the combined models is their focus on student choice as a process rather than simply discrete decisions. This process-based approach allows variables to interact at different stages and for outputs of one stage to become inputs for subsequent stages. Thus, combined

models have a broader applicability and represent the most extensive frameworks for understanding student choice (Hossler, Braxton and Coopersmith, 1989).

Hossler, Braxton and Coopersmith place combined models into two groups, “three-stage” and “multi-stage” (1989). However, they note there is much overlap between groups and that in many ways three-stage models are more simplified versions of the multi-stage models. The paragraphs below summarize one influential model from each group. Also discussed is a third model, based on those two influential models. That third model provided a basis for the only two international graduate student choice models identified during the literature review.

4.1.4 Jackson’s “Combined Student Choice Model” (1982)

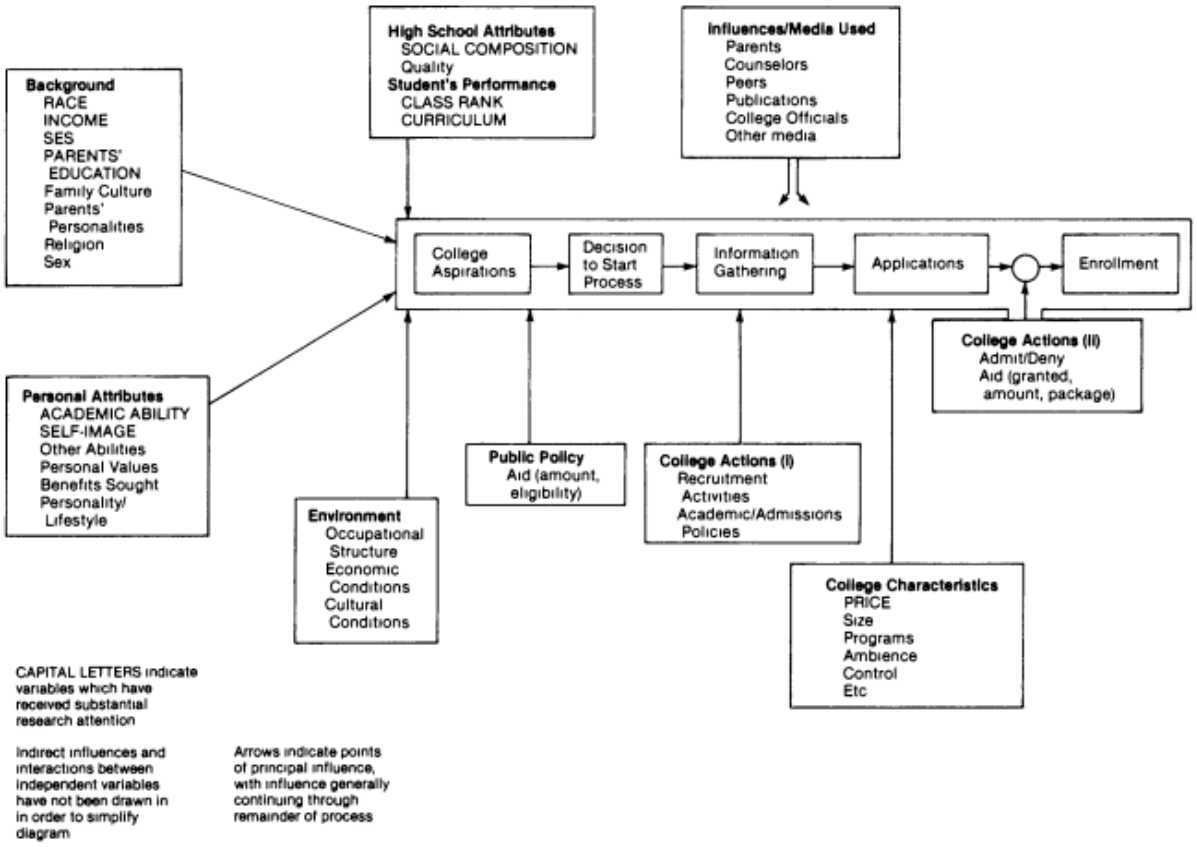
Jackson created a model of student choice based on three phases (1982). Phase I (preference) is strongly rooted in status-attainment models and is primarily related to students forming aspirations to pursue higher education. The three most important variables in this phase are a student’s academic achievement, social context, and family background. In Phase II (exclusion) students eliminate HEIs and form a ‘choice set’ based on institutional information collected. The most important variables in this phase are geographic location and availability of information. Jackson notes that students often do not have access to complete or accurate information. Consequently their decisions in this phase are not always rational, and HEIs are excluded that should have been considered and vice versa. In Phase III (evaluations) students create a rating scheme, based on costs and benefits of each HEI, to assess their choice set and select a HEI to attend. Overall, Jackson rates family background, academic achievement, geographic location, and college costs as the most influential factors in student choice.

4.1.5 Litten’s “Expanded Model of the College Selection Process” (1982)

Litten’s model represents a refinement of one he and Hanson released a year earlier. That “The College Attendance/Choice Process” model included economic and status attainment elements and represented a three-stage process based on six steps (Hanson and Litten, 1982). Litten’s model (Figure 3) removed the stages and focused on the steps to create a more linear, yet more complex visual model, that also integrated the work of Chapman (1981) to incorporate a greatly expanded set of influencing factors in each step.

Among the most important contributions of this model was the view of student choice as a continual process in which students gradually move from a wide range of options to attending a specific HEI (Hossler, Schmit and Vesper, 1999). The model was also valuable for

Figure 3: Litten's "Expanded Model of the College Selection Process" (1982)



incorporating a large number of variables besides individual student characteristics and social backgrounds. Thus, while the model does not indicate the relative strength of influencing variables, its inclusion of other factors, such as public policy, HEI actions, and the media, allow the model to have some applicability beyond the student population for which it was designed, namely high school students seeking to enter undergraduate education in the US. Aspects of this model, most notably the idea of student choice as a process influenced by many variables at different stages, can be seen not only in the following domestic undergraduate model created by Hossler and Gallagher, but also in Chen's theoretical model used to understand international graduate student choice presented at the end of this chapter.

4.1.6 Hossler and Gallagher "Three Phase Model of College Choice" (1987)

Hossler and Gallagher's model (1987) draws upon the work of Jackson (1982) and Litten (1982) and presents student choice as a three-phase model in which individual and organizational factors interact at each stage. As students proceed through each phase, they develop more knowledge of their options and their interaction with HEIs increases.

In the first phase (predisposition), students decide to undertake higher education. The most important factors in this phase are student characteristics (e.g. socioeconomic status, ability) and their interaction with influences from significant others (e.g. parental and peer attitudes toward higher education). Organizational factors in this phase are of secondary importance and are related to the student's high school (e.g. academic quality, setting) and the proximity of HEIs. The end of this phase involves the student making the decision to engage in a search for HEIs or to evaluate non-higher education alternatives.

In the second phase (search), students gather institutional information and begin their interaction with HEIs. Institutional search activities represent the most influential organizational factor in this phase. This is the time when HEIs can most impact student choice. Higher ability students tend to engage in more sophisticated search strategies, but most students gain more knowledge and thus improve their search strategies as they go through this phase. Yet, students do not always make rational choices or seek out the most valuable information. At the end of this phase students either create a choice set of HEIs to gather more information and consider applying to, or decide not to pursue higher education.

In the final phase (choice), students and HEIs engage in "courtship" activities such as exchanging communications and financial aid offers. However, this courtship only takes place with HEIs in a student's choice set, thus other HEIs are no longer able to participate. Students evaluate HEIs in their choice sets and choose the institution which represents the best value/benefit for their personal situation. Student perceptions of academic quality appear more influential in this phase, and their choices may have already been made in the previous phase as students often enroll in the top school in their choice set to which they are admitted.

Figure 4: Simplified Hossler and Gallagher Model (Hossler, Schmit and Vesper, 1999)

The Hossler and Gallagher model can be seen more as a conceptual model that simplified and synthesized previous student choice models by distilling student choice down to a three-phase process (see Figure 4) (Hossler, Schmit and Vesper, 1999). The model also puts student actions at the center of the choice process (Hossler, Braxton and Coopersmith, 1989). That simplification and focus on students as the prime actors allows the concepts of this model to be mapped onto other models in different contexts. Examples can be seen in the models

created by Chen (2007b), Mazzarol and Soutar (2002), and Ruby (2007) which used a three-stage model in attempts to understand international student choice.

4.2 International Student Choice Models

The models presented above provide a useful understanding of the general decision-making process students undergo when electing to enroll in higher education and in the choice of a specific HEI. While these models have served as starting points for many studies of international student decision-making behavior, there has been minimal validation of these models in that context. This is important since these models were primarily designed with a US domestic undergraduate student population in mind. The choice process for international students may in fact be more complex than these models suggest. Choosing to leave one's home country to pursue higher education in another country represents a substantial decision, and early studies suggest the factors related to international student choice are wider than those identified for domestic student choice (Lee, 2008).

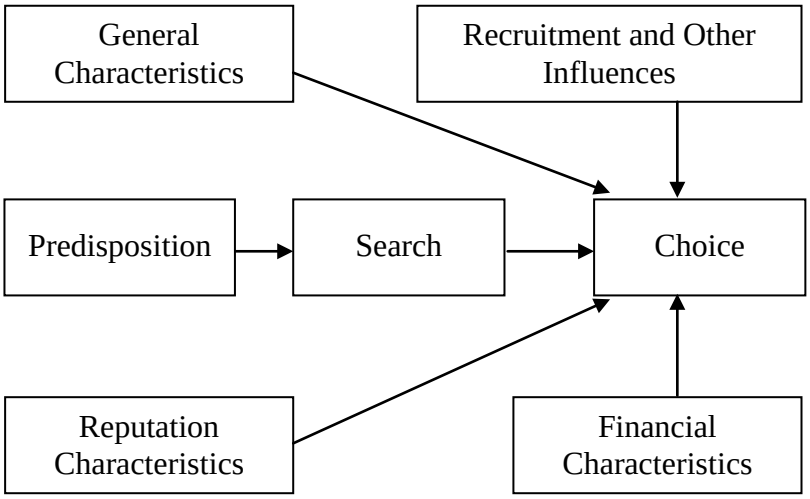
Unfortunately there has also been minimal research conducted to create theoretical models specific to international student contexts. As a result, while some information is known about why students choose to study internationally, less is know about how they gather information and choose a HEI. Consequently this thesis had few choice models specific to international students to draw upon. This section presents those models focusing on ones utilizing 'push-pull' theory to understand international student choice. The section concludes with a framework that integrated push-pull theory with process-based decision-making models.

4.2.1 Ruby's "Model of College Choice of International Graduate Students"

Ruby's model (2007) (see Figure 5) represents one of only two models indentified that were specific to international graduate students. Her model also provides a useful introduction to how the general student choice models presented above have been influential to the study of international student choice. The model is based on results from a study involving 329 international graduate students from 65 countries studying at six US HEIs. Ruby used Hossler and Gallagher's model as a guiding framework in her study. She queried students about the importance they placed on a wide range of factors she identified from a literature review. Based on those responses, and through the use of factor analysis, those choice factors were placed into four groups of characteristics: general institutional (e.g. attractive campus, course offerings, social atmosphere, friendliness of staff/faculty, library); financial (e.g. opportunity

for assistantship/fellowship, amount of funding offered, scholarship availability); reputation (e.g. reputation of HEI or faculty or program, accreditations, research opportunities); and recruitment/other influences (e.g. input from family/friends/students/alumni, admissions process, previous meeting with HEI representative, list of rankings of universities). Ruby then integrated those categories of factors with Hossler and Gallagher's model to create a model of international graduate student choice, focused on the selection of a HEI.

Figure 5: Ruby's "Model of College Choice of International Graduate Students" (2007)



4.2.2 Push-pull Theory

Push-pull theory can be traced to Lee's theories on migration (1966). The theory has been extended to understand behavior in other domains including the factors affecting the decision-making of international students. In that context, Mazzarol and Soutar define push factors as those that "operate within the source country and initiate a student's decision to undertake international study (2002, pg. 82)." Pull factors on the other hand "operate within a host country to make that country relatively attractive to international students (2002, pg. 82)." Models based on push-pull theory are the most commonly used frameworks to understand the flows of international students and their choice of a HEI (Cantwell, Luca and Lee, 2009).

4.2.3 Wit et al.'s Macro-level Push/Pull Factors Framework

Wit, Agarwal, Said, Sehoole, and Sirozi recently created a framework (see Table 3) that allows comparisons of the importance various push and pull factors play in international student flows from a country or regional perspective (Wit et al., 2008). Their framework is also different in that it incorporates negative push and pull factors. Based on previous studies of international student flows, their framework provides an excellent introduction to the many

Table 3: Wit et al.'s Push/Pull Factors Framework

From EU		**Push Factors (Outbound Mobility from home country/region)**	Toward EU		**Pull Factors (Inbound Mobility towards host country/region)**
Strength	**Change**	**Educational Factors**	**Strength**	**Change**	**Educational Factors**
–	↓	(un)Availability of higher education	++	↑	Higher education opportunities
– –		Basic human resource capacity	+	↑	System compatibility
–		Ranking/status of higher education	+		Ranking/status of higher education
–	↑	Enhanced value of national vs. foreign degree	++		Enhanced value of national degree
– –	↑	Selectiveness of domestic higher education	+		Diversity of higher education
–	↑	Availability of distance learning	++		Absorptive capacity of HE
– –	↑	Increasing presence of private providers	+	↑	Active recruitment policy
– –		Increasing presence of foreign providers	++	↓	Cost of study
+	↑	Experience with international mobility	+		Existing stock of national students
+	↑	Strategic alliances with foreign partners	+	↑	Strategic alliances with home partners
Political/Social/Cultural Factors			**Political/Social/Cultural Factors**		
+		Linguistic isolation/affinity	++	↑	Language factor
+		Cultural and religious disposition/affinity	–	↑	Cultural ties
+		Colonial ties	++	↓	Colonial ties
– –		Political instability	+		Lure of life
+		Regional unity	+		Regional unity
– –		Information isolation	+	↑	Stock of citizens of country of origin
– –		Emigration policies	+		Immigration policies
+	↑	Strategic alliances	+		Strategic alliances with home country
++		Academic Freedom	++		Academic freedom
Economic Factors			**Economic Factors**		
+	↑	Dependence on world economy	++	↑	Import/export levels
+		Financial capacity	+	↑	Level of assistance
– –		Human development index factor	++		Human development index
++		Employment opportunities on return	–	↑	Employment opportunities during study
–		Geographical distance	–	↑	Employment opportunities after study
			–		Geographical distance

Very significant/very positive (++), significant/positive (+), minimally significant/negative (-), insignificant/very negative (--), increasing (↑), decreasing (↓)

Framework created by (Wit et al., 2008) to evaluate the importance of push/pull factors within regions and countries. The strength and change columns represent Wit's evaluation of the EURODATA region from an outbound and inbound mobility perspective (Wit, 2008b). Strength is the relative importance as a positive or negative push/pull factor. Change represents an increased or decreased importance of the factor in recent years.

Adapted from (Wit et al., 2008)

factors that influence student mobility. The authors placed the push/pull factors into three categories, which are related to the primary rationales for cross-border education discussed in Section 2.3. Their "Educational Factors" category is linked to capacity building. "Political/Social/Cultural Factors" can be related to mutual understanding rationales, and "Economic Factors" are linked to both revenue generation and skilled migration rationales. Their model is also significant in the context of this study for its inclusion of LTRS as both a push and a pull factor that influences student mobility.

Table 3 also shows the importance the identified push/pull factors have in the context of the EURODATA[21] zone based on Wit's analysis of the region (2008b). However, it should be noted this is a generalization and there are strong differences between countries in the region, most notably France, Germany and the UK. Wit also examined the rationales for the region and found mutual understanding plays a role in both inbound and outbound mobility, but its role in inbound mobility has decreased. Capacity building and revenue generation only play a significant role in inbound mobility. Capacity building has decreased in importance, while revenue generation rationales have increased. Skilled migration was noted as playing an increasing role in both inbound and outbound mobility in the region.

4.2.4 Mazzarol and Soutar's "Push-Pull" Model

In contrast to Wit et al.'s model which focused on factors influencing international student flows, international student choice studies focus on the individual student level. Those models seek to understand the importance of various push/pull factors in international student decision-making (Pimpa, 2003). Mazzarol and Soutar (2002) created a leading example of a push-pull theory based model developed to understand that decision-making process (see Table 4). They developed their model by consolidating and further analyzing results from four previous Australian-based studies which included a combined 2485 responses from students in China, India, Indonesia, and Taiwan. Their model is particularly noteworthy and useful for its integration of a process-based student choice model with a range of push/pull factors.

Mazzarol and Soutar's model follows three stages: (1) decision to study abroad rather than locally, (2) choice of a host country, and (3) choice of a HEI. Their model is not unlike the domestic student choice models discussed, particularly at the first and third stages, which can

[21] The zone is (a) the 27 EU members: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France. Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Poland, Portugal, Romania, , Slovenia, Slovakia, Spain , Sweden and the UK; (b) the 4 EFTA members: Switzerland, Iceland, Liechtenstein, and Norway; and (c) Turkey (Kelo, Teichler, and Wächter, 2006).

be related to predisposition and choice. The authors noted the most influential push/pull factors overall were recognition of qualifications, HEI quality and reputation, strategic alliances, quality of staff, alumni base, and existing international student populations.

Table 4: Mazzarol and Soutar's "Push-Pull" Model (2002)

Stage	Influential Push/Pull Factors
1. Decision to study abroad rather than locally	Mostly influenced by push factors including: • Perception programs abroad better than those locally • To gain better understanding of Western culture • Difficult access to higher education in home country • Program not available in home country • Intention to migrate

2. Choice of host country	Mostly influenced by pull factors including:
	• Level of knowledge and awareness of the host country
	  o Availability and ease of information
	  o Host county's reputation for quality
	  o Recognition of host country's qualifications
	• Personal recommendations (e.g. parents, friends, relatives)
	• Cost issues
	  o Financial costs (Tuition, living expenses, travel, potential for part-time work)
	  o Social costs (safety, crime, racism, presence of other home country students)
	• Environment (study climate, physical climate, lifestyle)
	• Geographic proximity (distance and time to home country)
	• Social links (family or friends living in host country or who studied there previously)

3. Choice of HEI	Mostly influenced by pull factors towards specific HEIs including: • Reputations for quality, market profile, promotion and marketing efforts (e.g. agents and advertising) • Range of programs, alliances or coalitions, offshore teaching programs, Staff expertise, degree of innovation, use of IT, resources, size of alumni base

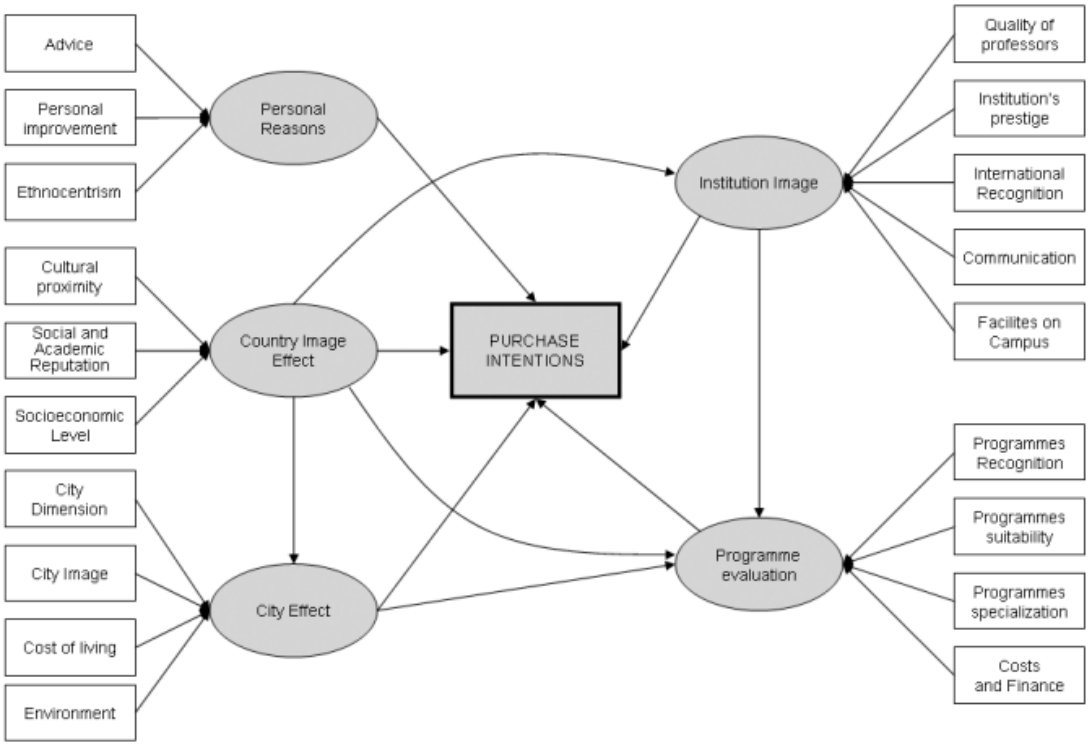
Since Mazzarol and Soutar developed their model, several researchers have utilized push-pull theory to study the decision-making process of international students and the important factors in that process (Chen, 2007b; Daily, Farewell and Kumar, 2007; Li and Bray, 2007; Maringe and Carter, 2007; Pimpa, 2003; Tang and Bhadury, 2006). While some studies used push-pull theory in similar contexts to Mazzarol and Soutar (i.e. Asian students in Australia) (Pimpa, 2003; Tang and Bhadury, 2006), other studies extended the theory's use, including international business students in the US (Daily, Farewell and Kumar, 2007), African students in the UK (Maringe and Carter, 2007), mainland Chinese students in Hong Kong and Macao (Li and Bray, 2007), and East Asian graduate students in Canada (Chen, 2007b).

4.2.5 Cubillo, Sánchez, and Cerviño's "Model of International Students' Preferences"

While Cubillo, Sánchez, and Cerviño's model (2006) of international student choice does not directly reference previous student choice or push-pull theory, in many ways it can be seen as a one-stage model based primarily on institutional, national, and city pull factors. The model

(Figure 6), seeks to understand a student's "purchase intention" through the interaction of four categories of influencing factors: (1) Personal reasons (e.g. future job/earnings prospects, improve language skills, live in a different culture, make international contacts, and recommendations from family/friends/professor); (2) Country/City Image (e.g. academic and social reputation, cultural/linguistic proximity or distance, development level, cost of living, immigration procedures, work during study option, degree length, safety and security, social facilities, international or HEI environment; (3) Institution Image (e.g. prestige, rankings, brand/academic/researcher/quality reputation, faculty expertise and experience, HEI facilities, atmosphere, and social life); and (4) Program Evaluation (e.g. international/employer recognition, program suitability/specialization/quality, total costs).

Figure 6: Cubillo, Sánchez, and Cerviño's "Model of International Students' Preferences" (2006)

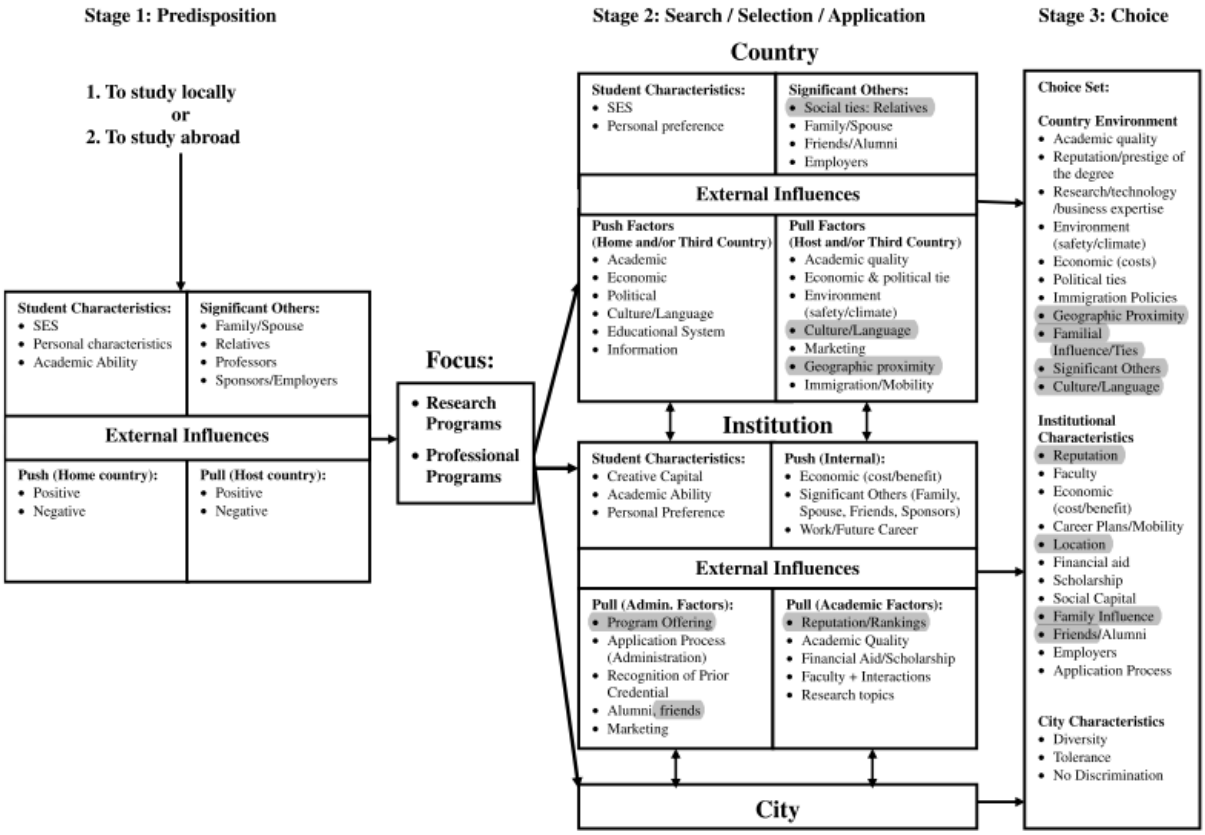


Unfortunately the authors presented their model as hypothetical. While they offered research propositions, they did not conduct an empirical study to test the model's validity or their implied interactions between factors. Nonetheless, the model is one of the few created in an international student context. As a result, it provides a useful summary of the many potential factors influencing international student choice the authors identified from previous studies. It is also noteworthy as one of the few models to incorporate LTRS as a decision-making factor.

4.2.6 Chen's "Synthesis Model"

Chen's study (2007b) is particularly relevant to this project as it is one of the few that focused on international graduate student choice. Along with Ruby, it represents the only theoretical models indentified specific to that population. Chen's study was also the only one found that directly measured LTRS as a push/pull factor in international graduate student choice. Thus, her model (Figure 7), which draws on Neice and Braun[22], Hossler and Gallagher's "Three Phase Model of College Choice" (1987), and Mazzarol and Soutar's "Push-Pull" model (2002), offers an excellent resource for understanding the context and results from this thesis.

Figure 7: Chen's "Synthesis Model" (2007b)



Note: Highlighted factors correspond to those being examined in this research project.

Chen developed her "Synthesis Model" based on an extensive review of previous undergraduate, graduate and international student choice studies. Her model is rooted in econometric, marketing, and information-processing theories and was used to study the choice of a HEI by East Asian graduate students (i.e. China, Hong Kong, Japan, Korea, and Taiwan) at two large universities in Toronto. Chen revised her model based on results from her study.

[22] Neice, D., and Braun, P. (1977). *Patron for the World*, Ottawa: Canadian Bureau for International Education. This document was not reviewed for this thesis.

Chen contributed notably to understanding international graduate student choice by providing a flexible interactive three-stage model of that decision-making process. In stage 1 (predisposition), students decide to study abroad rather than locally. During stage 2 (search/selection/application) students gather information to establish a choice set of HEIs of which to apply. In the third stage (choice), students select a HEI from those which granted admission. At each stage students are influenced by three primary categories of factors: student characteristics (e.g. socio-economic status, academic ability, social and creative capital, personal characteristics and preferences); significant others (e.g. spouse, relatives, friends, professors, employers); and external push/ pull factors (e.g. positive or negative forces from home and host countries, HEI attributes). Figure 7 shows examples of those factors in relation to the stages in which they influence international graduate student choice.

In contrast to Mazzarol and Soutar's model, which was based on three sequential stages (i.e. choice to study abroad, choice of country, choice of HEI), Chen's model represents the results of her research which indicated students may select between countries, HEIs, and cities in any order, rather than strictly choosing a country first and then a HEI. She also found interactions occur between country, HEI, and city factors in the search/selection/application and choice stages, and students may consider and apply to multiple HEIs in different countries and/or cities at the same time. Alternatively they may bypass one or more of those decisions and base their choice strictly on one option (e.g. choosing a HEI without considering host country factors). Her model also incorporates her findings that most students choose program type first, and that choice guides their decision-making throughout the process. She also found that information gathering and decision-making factors varied depending on the type of program the student was pursuing (i.e. research vs. professional).

4.3 Conclusions

International student choice is a surprisingly under-studied aspect of the growing global dimensions of higher education. In the limited research that has taken place, push-pull theory has served as the most common starting point for models seeking to understand international student choice. However, in many ways those models remain experimental and have not been subject to extensive empirical testing. As a result, there are some current limitations and concerns to existing push-pull models. As an example, most are based on factors related to understanding South-North student mobility (Cantwell, Luca and Lee, 2009). Consequently, those models may be less useful in understanding factors related to student choice in the

substantial North-North and the increasing South-South mobility contexts. Those contexts may in fact involve a dynamic of factors not well explained by push-pull theory. In addition, most push-pull student choice models were created in the context of English-speaking host countries. The global ascent of English in higher education may contribute to an interaction of push/pull factors in those countries that differs from that in non-English speaking nations. In addition some international student choice models have been based on results from research involving Asian students. Students from other regions may have different decision-making processes or important choice factors.

These limitations and concerns are particularly relevant to this project since it involves a worldwide international student sample in the context of the EU/EFTA region which is both linguistically diverse and the location of extensive North-North student mobility. Nonetheless the models presented above may represent the best we currently have to work with in comprehending this neglected area of higher education. Thus while the models presented may not be ideal, they are useful for contextualizing the results of this thesis.

These models helped contextualize the primary dependent variable in this thesis, namely the importance students placed on LTRS in their choice of a HEI. While academic reputation is cited in most student choice models presented, only the three models from Wit et al., Cubillo, Sánchez, and Cerviño, and Chen make direct reference to LTRS as an important choice factor in their models. While the latter two models place LTRS as an institutional pull factor, Wit et al. see LTRS as both a push and pull factor at national levels which influences international student flows. An examination of LTRS as a push/pull factor away/towards national higher education systems as a whole is beyond the scope of this study. However, the findings presented in this thesis add to the understanding of LTRS as an institutional level pull factor to international graduate students.

Chapter 5: Review of Previous Student Choice Studies

5.1 Summary of Literature Review

During the early stages of the extensive literature review undertaken for this project, it became clear that, as with the theoretical models presented in the previous chapter, very few international graduate student choice studies have been conducted. Even fewer such studies which incorporated LTRS as a choice factor were found. As a result, in order to find studies relevant to this project, the scope of the literature review was widened to include other areas of research. This included student choice studies focused on domestic graduate students as well as both international and domestic undergraduates. All three of these areas, particularly undergraduates, have been the focus of more extensive student choice research, mostly notably in regards to LTRS. While undergraduate and graduate students are different populations, the much more established research base into undergraduate student choice, in both domestic and international contexts, provided background for interpreting the results of the data analyzed to understand the choice of a HEI among this project's sample.

In addition to the two international graduate student studies which developed theoretical models presented in the last chapter (Chen, 2007b; Ruby, 2007), only one other study specific to international graduate students was found (Mulvey and Langer, 2003). More common were studies that mixed international undergraduate and graduate student populations (ACA, 2005; AEI, 2003; Cantwell, Luca and Lee, 2009; Daily, Farewell and Kumar, 2007; Lee, 2008; Li and Bray, 2007; Pimpa, 2005; Rawson, 2004; Shah and Laino, 2006; Shanka, Quintal and Taylor, 2005; UNITE, 2006a; UNITE, 2006b). Regrettably not all of these studies included LTRS as a choice factor. In addition, these studies either did not specify the exact nature of their sample, or did not differentiate results based on degree level. Two market research studies of MBA students were also identified (GMAC, 2008; GMAC, 2009; Quacquarelli and Geraghty, 2008). However, these studies were not always clear as to the mixture of domestic and international students in their sample and subsequent analysis. General domestic graduate student studies, that did not include LTRS, were also reviewed to provide background for the independent variables examined in relation to the importance placed on LTRS of different sub-samples in research question 2 (e.g. gender, age, nationality) (Kallio, 1995; Malaney, 1987; Oosterbeek, Groot and Hartog, 1992; Poock and Love, 2001; Stiber, 2001; 2000; Webb, Coccari and Allen, 1996; Webb et al., 1997).

Only two studies were found that examined the importance of LTRS in an international graduate student context. One directly measured the role of LTRS among 140 East Asian (China, Hong Kong, Japan, Korea, and Taiwan) graduate students at two universities in Toronto (Chen, 2007a; Chen, 2007b). The other examined LTRS indirectly, as part of a range of factors related to "recruitment and other influences" among international graduate students at six US HEIs (Ruby, 2007). As so few studies were found directly related to this project's target population, during the literature review substantial effort was made to indentify as many previous studies as possible that included LTRS as a choice factor. This included other student choice contexts, including domestic and undergraduate. Investigations were made for studies from HEIs, government, or market research sources, as well as conferences papers, journal articles, books, and doctoral dissertations in English and other languages.

Among the studies found which made some reference to the role of LTRS were a number of qualitative studies including both domestic and international students. A few examples of these studies in an international student context include: African students in the UK (Maringe and Carter, 2007); international students at single large public HEIs in the US (Jenkins, 2001; Lee, 2008); Indian graduates students studying engineering at a UK HEI (O'Brien et al., 2007); and Pakistani students at three American HEIs (Hamrick, 2007). In all of these studies, LTRS were mentioned in focus groups and interviews by students as an influencing factor in their choice of a HEI. However, the qualitative nature of these studies with small samples and limited geographic coverage make them less directly transferable to this project investigating international student choice with a wider range of both students and countries.

The findings from the literature review presented in this chapter focus more on the results from similar quantitative studies which examined the role of LTRS in student decision-making. These studies were primarily found in domestic contexts in Germany, the UK and the US (Briggs, 2006; Briggs and Wilson, 2007; Eccles, 2002; Griffith and Rask, 2007; Art and Science Group, 1995; Hachmeister and Hennings, 2007; HEFCE, 1999; Heine et al., 2008; HERI, 2007; HERI, 2008; Howard, 2002; LHI, 2006; McDonough et al., 1998; Mueller and Rockerbie, 2005; Scott, 2006; Teranishi et al., 2004; Veloutsou, Paton and Lewis, 2005). While fewer international undergraduate studies were found (Chen, 2008; Roberts and Thompson, 2007; Soo and Elliott, 2008), two recent large-scale UK projects that compared domestic and international undergraduate students proved particularly useful to this study (Purcell et al., 2008; UCAS, 2008). Another large-scale study which asked potential

international students to rate how eleven potential factors could contribute to the attractiveness of studying in the EU was also useful (ACA, 2005). As with international graduate students, the role of LTRS in domestic graduate student choice has been infrequently studied (Davis and McCarthy, 2005; Montgomery, 2002; Pivo, 2005).

The studies presented above have taken three primary directions. The first group relied on institutional data to compare changes in the number of applications a HEI received in relation to changes in rank in various national LTRS. The second group examined the relative importance of LTRS as an information source. While both of these approaches to measuring the influence of LTRS are different than the one taken in this project, the results of those studies helped provide a broader context to understand the role of LTRS in student decision-making. The third area, and the most directly relevant to this project, are studies which examined the influence of LTRS among other student choice factors.

Complementing the college choice theories presented in the previous chapter, the results of the literature review showed students consider a wide range of factors in the complex multi-faceted decision-making that goes into the selection of a HEI. This complexity was evident among all student groups examined. The review revealed a small, but fairly well-established knowledge base in regards to the factors related to undergraduate student choice, including the importance they place on LTRS. However, when examining other student groups closer to this project's target population, the level of knowledge decreased dramatically with much less known about international graduate student choice in general and even less in regards to the role LTRS play. This provides clear justification for this research project.

5.2 Relating Literature Review Findings to Research Questions

This section synthesizes the results from the literature review using the project's research questions as a framework. Findings from the individual studies analyzed are combined and summarized based upon those questions. This provides an understanding of what is currently known in regards to this project's dependent variables, namely the factors related to student choice, including LTRS, as well as how this project's independent variables (e.g. gender, age, discipline, degree level, country of study and origin, international student status) relate to those factors. In order to concisely present those findings, specific details from each previous study are not presented. Instead, Appendix A provides brief summaries of relevant findings from each study. In particular readers may wish to review the summaries for studies which

were particularly useful in this project (ACA, 2005; Chen, 2006; 2007a; 2007b; 2008; GMAC, 2008; 2009; HERI, 2007; 2008; McDonough et al., 1998; Mulvey and Langer, 2003; Purcell et al., 2008; Quacquarelli and Geraghty, 2008; Ruby, 2007; UCAS, 2008).

5.3 Research Question 1. Does the importance of LTRS and other student choice factors vary between domestic and international graduate students?

The literature review showed that students in all contexts considered a wide range of factors when making the complex decision of which HEI to attend. Since so few international graduate student choice studies were found (Chen, 2007a; 2008; Mulvey and Langer, 2003; Ruby, 2007), other student choice contexts were also examined including: international students in general (ACA, 2005; AEI, 2003; Daily, Farewell and Kumar, 2007; Pimpa, 2005; Rawson, 2004; Rees, 2002; UNITE, 2006a); domestic graduate students (Kallio, 1995; Malaney, 1987; Mulvey and Langer, 2003; Pivo, 2005; Poock and Love, 2001; Webb, Coccari and Allen, 1996; Webb et al., 1997); domestic undergraduates from a wide range of countries including Australia, Finland, Germany, the Netherlands, New Zealand, the US, and the UK (Connor et al., 1999; Hachmeister and Hennings, 2007; Heine et al., 2008; Hoyt and Brown, 2003; Keskinen, Tiuraniemi and Liimola, 2008; Lin, 1997; Purcell et al., 2008; Soutar and Turner, 2002; UCAS, 2008) and international undergraduates (Allen and Higgins, 1994; Joseph and Joseph, 2000; Purcell et al., 2008; UCAS, 2008).

From each study, a list of the five most important factors in student choice was collected. Those factors were compiled to create lists (Table 5) of the five most commonly found highly influential factors in student choice for each group[23]. Only overall HEI reputation was a commonly cited top five factor among all four students groups. Factors related to the program of study offered were among the most important for three groups, the exception being international graduate students. Domestic and international undergraduates were the most similar with four out of the five top factors the same. The exception was location for domestic undergraduate students and program and/or departmental reputation for international undergraduates. Factors related to reputation for teaching quality at the HEI, as well as the employment prospects for its graduates, were among the top choice factors for both undergraduate groups, but were not among the top five factors in any graduate student study.

[23] As so few international graduate student studies were found it was not possible to identify five frequently cited choice factors for that group. These factors represent those cited among the top five in the two studies for which the importance of specific choice factors international graduate students could be determined (Chen, 2007a; 2008; Mulvey and Langer, 2003).

Table 5: Summary of Most Important Student Choice Factors from Literature Review

Domestic UG	International UG	Domestic G	International G
overall HEI reputation	overall HEI reputation	location	overall HEI reputation
teaching reputation	program of study	overall HEI reputation	Program/dept. reputation
program of study	Program/dept. reputation	program of study	financial aid/campus employment
location	teaching reputation	financial aid/campus employment	
graduate employment prospects	graduate employment prospects	academic atmosphere	

While a much smaller number of graduate student studies were found, in those studies, factors related to financial aid and/or campus employment offers were important for both domestic and international graduate students. Those factors were infrequently found among the most important factors in undergraduate studies. Location was an important factor for domestic graduate students, but less so for international ones. International graduate students studies did frequently note factors related to the reputation of the program and/or department were more influential, which was less important in domestic contexts. The academic atmosphere of the HEI was frequently cited by domestic graduate students but not other groups.

While these lists represent all studies discovered in a graduate context, in an undergraduate context, only studies found which included LTRS as a choice factor were summarized. There are many other undergraduate student choice studies that did not include LTRS. However, as undergraduate students are not the subject of this thesis, those studies were not incorporated into these lists. As a result, the undergraduate columns should not be seen as completely comprehensive review of those previous student choice studies. Nonetheless the information contained within all four groups does suggest some patterns.

Clearly institutional reputation was an important factor in the choice of all types of students in the examined studies. However, it was also clear that some factors were more important to students in particular contexts. Undergraduates, both domestic and international, placed more importance on teaching and their employment prospects after graduation, compared to graduate students. Graduate students placed more importance on securing financial aid and/or employment at the HEI in order to pay for their graduate studies. Location also seemed to play a key role in the choice of domestic students, but less so for international students. These differences indicate that it is important to consider student populations individually rather

than grouping them together, as is often done in international student choice studies. While these four populations are similar in many ways, they also have key differences. As a result, those differences should be taken into account in student choice research. This project adds to the knowledge of these differences and is among the first to directly compare the importance of choice factors among domestic and international graduate students using the same instrument.

As was discussed in Section 3.4, there is a belief among many in higher education leadership that LTRS play a more important role in international than domestic student choice. Yet, this has been subject to very little empirical study. A few studies have compared the importance of LTRS between domestic and international undergraduate student populations in the US and UK (Connor et al., 1999; McDonough et al., 1998; Purcell et al., 2008; UCAS, 2008; 2006a; UNITE, 2006b). All of these studies with the exception of (UNITE, 2006b) showed LTRS were more important to international undergraduate students. However, their findings are only indirectly relevant to the current project and do not give any indication of any potential differences in the importance of LTRS among graduate students. Unfortunately only one study which compared domestic and international graduate students was identified (Mulvey and Langer, 2003), and that study did not include LTRS as a student choice factor. As a result, this project is among the first to compare the importance of various choice factors among domestic and international graduate students, and is the first study to evaluate differences in the importance those groups placed on LTRS.

5.3.1 Research Question 1a. How does the importance of LTRS compare to other student choice factors?

While LTRS was not ranked as a top five factor in the choice process for any of the four groups examined, the studies reviewed did show LTRS were a middle range choice factor. Although this project has a different focus, studies that evaluated LTRS as an information source provided valuable background to this research question. Most studies found were in a range of national contexts involving domestic undergraduate students and showed LTRS to be a mid-level information source: Germany 7th of 13 sources in terms of use, 5th of 13 in terms of influence (Heine et al., 2008); UK 9th of 17 in influence (HEFCE, 1999), 4th of 7 in use and influence (Scott, 2006), 6th of 10 in influence (Briggs and Wilson, 2007); US 10th of 14 in use, 12th of 14 in influence (Art and Science Group, 1995), and 14th of 16 in use, 8th of 16 in influence (LHI, 2006).

In an international student context, only Rawson's study addressed LTRS as an information tool, finding it as the 4th most important of 18 information sources in his mixed undergraduate and graduate student survey (2004). In a graduate context, two MBA student studies showed LTRS as the 7th most used of 13 sources (Quacquarelli and Geraghty, 2008), and the 1st to 7th most used of 20 sources depending on a student's region of origin (GMAC, 2008).

An interesting variation on measuring the potential importance of LTRS to international students can be seen in a 2005 study by the Academic Cooperation Association (ACA). That study asked over 15,000 potential international students, "To what extent would the following means and programmes enhance the attractiveness of studying in the European Union? (2005, pg. 167)." A large majority stated that an EU-wide ranking of HEIs and programs would enhance the attractiveness of studying in the area. This was the second highest rated option, following only increased financial support for non-EU international students. Establishment of an EU LTRS was rated higher than other programs including those that are part of the Bologna Process (e.g. ECTS, Diploma Supplements, and the Bachelor and Master degrees).

More directly relevant to this project are studies of LTRS as a choice factor. Most studies have been in domestic undergraduate contexts. These have shown LTRS are a mid to low-level factor compared to other areas influencing student choice in various countries: Germany 5th out of 6 factors (Hachmeister and Hennings, 2007), and 9th of 19 (Heine et al., 2008); US 11th of 21 (HERI, 2007; McDonough et al., 1998) and 12th of 16 (LHI, 2006); and the UK 7th of 21 (Purcell et al., 2008), 8th of 21 (UCAS, 2008), and 5th of 8 (UNITE, 2006b).

When examining international students the picture is somewhat mixed. A study of both graduate and undergraduate international students in Mexico found rankings ranged from the 1st to 3rd most important of 8 factors examined (Cantwell, Luca and Lee, 2009). A UK study, also mixing graduate and undergraduate international students, identified LTRS as the 6th most important out of 7 academic factors (Rawson, 2004). However, this study is limited in generalizability since it involved students at a single HEI. In comparison, one of two large-scale UK studies found LTRS to be an important factor in international undergraduate choice, ranging from 4th out of 21 factors for non-EU international students to 6th for international students from the EU (Purcell et al., 2008). The other study noted LTRS as the 5th most cited out of 12 as a "very important" factor in student choice from each of the international regions examined (UCAS, 2008). However, despite being the 5th most cited factor for each group, there was substantial variation in the percentages citing LTRS as very important: EU (28%),

Africa (36%), and the Far East (42%) (UCAS, 2008). On the one hand, the large sample sizes and the fact that these studies involved students across the UK adds to generalizability in that country's context. On the other hand, the UK has among the most established LTRS traditions in Europe, which may be a significant contributing factor to this greater level of importance. This is corroborated by the fact that as seen above, while LTRS were a mid-level factor for domestic UK students, it was at the top of the mid-level range. As Germany also has a long standing LTRS tradition, it would be useful to compare international students in that context. Unfortunately no studies were identified that have done so.

Much less information was found in a graduate student context, and thus it is difficult to make concrete conclusions regarding this population. In two MBA studies, including mixtures of domestic and international students, LTRS were found as a mid-level factor: 7th out of 9 (GMAC, 2009); 6th to 10th of 13 depending on region of origin (Quacquarelli and Geraghty, 2008). In a US domestic graduate student study analyzed, LTRS were also a mid-level choice factor (10th out of 23) (Pivo, 2005). However, in the only study found specific to international graduate students, HEI rank was 6th and program rank was 7th out of 33 factors, implying LTRS had a higher level of influence (Chen, 2007a; 2008). Yet, these findings are somewhat limited in generalizability since they involved only East Asian students at two HEIs in Canada. Consequently, this project is the first to examine LTRS in relation to other international graduate student choice factors in a wide geographic and institutional context.

5.4 Research Question 2. Are LTRS more important to different demographic groups of international graduate students?

This research question seeks to discover if significant differences exist in the relative importance placed on LTRS by various demographic groups within the international graduate students in this project's overall sample. The sub-questions below present findings from the literature review in regards to the each group to be examined in this project's data analysis.

5.4.1 Research Question 2a. Degree Level (master and doctoral)

Only a few studies that examined differences in decision-making criteria or importance placed on LTRS between master and doctoral students were identified. The results in these studies were mixed, with three studies showing very few or no significant differences (Chen, 2007a; 2008; Pimpa, 2005; Stiber, 2001; 2000) and two demonstrating significant differences (Pivo, 2005; Ruby, 2007). Consequently, this project helps to clarify this situation through an

evaluation of the most influential choice factors to master and doctoral students as well as potential differences in the importance they place on LTRS.

5.4.2 Research Question 2b. Age

Only a handful of studies were found that examined the role of age in student choice. Age did appear to play a role in domestic undergraduate student studies (Dawes and Brown, 2002; McDonough et al., 1998). However, it is questionable how useful these findings are in a graduate student context, since older undergraduate students are often late or re-entry students who vary in work and family commitments compared to traditional age undergraduate students. The studies examined in a graduate context were mixed. A study of international graduate students (Ruby, 2007) and one with both domestic and international MBA students (GMAC, 2009) found no significant effect of age. However, in domestic graduate student contexts, one study noted age did play a role (Kallio, 1995), while another of students studying higher education found a moderate role (Poock and Love, 2001). In regards to LTRS, only McDonough et al. addressed this issue and found that as the age of undergraduate students increased, the likelihood they would indicate LTRS were important to their choice decreased (1998). As a result, this thesis is among the first studies to examine the interaction between age and the importance placed on LTRS by international graduate students.

5.4.3 Research Question 2c. Gender

The role of gender in student choice was very commonly investigated in the studies analyzed. Most of those studies found that gender did not play an important role in factors related to student choice or the importance placed on LTRS in various contexts: domestic undergraduate (Dawes and Brown, 2002), domestic graduate (Kallio, 1995; Poock and Love, 2001), international student (Daily, Farewell and Kumar, 2007; Joseph and Joseph, 2000; Lee, 2008; Ruby, 2007), and LTRS (Chen, 2007a; 2008; GMAC, 2008; Heine et al., 2008; Mueller and Rockerbie, 2005; Pivo, 2005; Scott, 2006; Veloutsou, Lewis and Paton, 2004). Of those that did find gender played a role, one involved undergraduates at a single HEI (Shank and Beasley, 1998), and the others involved students studying in specific disciplines (Briggs and Wilson, 2007; Montgomery, 2002; Oosterbeek, Groot and Hartog, 1992; Soo and Elliott, 2008). One interesting note from the Heine et al. report in Germany was that although no difference was found by gender in terms of use of LTRS, the study found male students were more likely to report LTRS were important in their final choice (2008). Taken together these findings suggest that looking at large student populations across HEIs, disciplinary groups,

multiple countries, etc., gender may not play a sizeable role. Yet, gender may be important when looking at sub-populations such as individual disciplines or countries. This confirms the need to investigate potential differences among this project's samples based on gender.

5.4.4 Research Question 2d. Academic Discipline

In many of the studies analyzed, discipline played a role in undergraduate, graduate, and international student choice contexts, as well as in regards to the importance students placed on LTRS (Briggs and Wilson, 2007; Chen, 2007a; 2008; Hachmeister and Hennings, 2007; Heine et al., 2008; HERI, 2007; Mulvey and Langer, 2003; Pivo, 2005; Ruby, 2007; Soo and Elliott, 2008). However, those studies also noted that significant differences can be found in the importance of LTRS even among students studying similar subjects within disciplinary groups, such as natural or social sciences. As a result, the approach of this project to evaluate the importance of LTRS based on the specific disciplines of biology, chemistry, economics, mathematics, physics, political science, and psychology rather than as larger disciplinary groups appears justified, and provides valuable information about potential differing levels of importance of LTRS among international graduate students pursing degrees in those fields.

5.4.5 Research Question 2e. Country of Study

While most studies of international students found queried students *from* multiple countries, no study was found that examined the decision-making process of international students *in* multiple counties of study. The differing methodologies and questionnaires employed in existing studies make direct comparison of their findings based on country of study difficult. While no multi-country comparisons were found, studies that indentified strong regional differences within countries help demonstrate the importance of making such comparisons (Heine et al., 2008; LHI, 2006; Li and Bray, 2007; Purcell et al., 2008). As a result, this study is the first to use the same instrument to investigate different international student groups based on country of study, rather than simply country of origin. This line of investigation is particularly important in a European context where countries vary substantially in the relative placement of their HEIs in global LTRS, as well as in the presence of national LTRS.

5.4.6 Research Question 2f. Country/Region of Origin

Like gender, the ethnicity or nationality of students was often explored in all types of student choice studies. All studies examined that evaluated ethnicity and/or nationality, found them to play at least some role in student choice (ACA, 2005; Cantwell, Luca and Lee, 2009; Chen, 2007a; Dawes and Brown, 2002; GMAC, 2008; HERI, 2007; 2008; Lee, 2008; LHI, 2006;

McDonough et al., 1998; Montgomery, 2002; Pivo, 2005; Poock and Love, 2001; Purcell et al., 2008; Quacquarelli and Geraghty, 2008; Rawson, 2004; Ruby, 2007; Shah and Laino, 2006; Shanka, Quintal and Taylor, 2005; Teranishi et al., 2004; UCAS, 2008). One finding noted across several studies was that students from Southeast or East Asian countries, or of ancestry from that region, often placed greater importance on LTRS in their decision-making (HERI, 2007; 2008; LHI, 2006; McDonough et al., 1998; Purcell et al., 2008; Rawson, 2004; UCAS, 2008). In addition, two studies that examined differences within that regional population found country of origin made a significant difference in the importance of LTRS (Chen, 2007a; Teranishi et al., 2004). These findings substantiate one goal of this project which is to evaluate the role of LTRS not only regionally, but also based on country of origin.

5.5 Summary

The summarized results from the literature review above demonstrate that little is currently known about the factors related to international graduate student choice and the importance they place on LTRS in their decision-making process. Nonetheless, the wide range of studies presented from different student choice contexts, does provide related results which are useful to frame and analyze the findings to this project's research questions. In many cases the answers to those questions are the first to address specific areas related to the decision-making of international graduate students and the importance they place on LTRS.

It appears, at least in some domestic undergraduate contexts that LTRS may be increasing in both use and importance to students in their choice of a HEI (Griffith and Rask, 2007; Heine et al., 2008; HERI, 2007; 2008; McDonough et al., 1998). LTRS may also be impacting admissions (Bowman and Bastedo, 2009; Meredith, 2004; Monks and Ehrenberg, 1999), and leading to increased applications from domestic and international students (Eccles, 2002; Mueller and Rockerbie, 2005; Roberts and Thompson, 2007; Sauder and Lancaster, 2006). In addition, the results from the ACA study (2005) presented, suggest that the introduction of an EU-led global LTRS, as discussed in Section 3.4, may be highly influential in international student choice in the future. With the numbers of LTRS and international students expected to continue expanding, it is important to understand the role LTRS play in the choice of HEIs by international graduate students. Therefore, the answers to this project's research questions will serve as a starting point to gaining a deeper understanding of the relationship between those two highly visible aspects of higher education.

Chapter 6: Research Design, Methodology, and Student Samples

This project's research questions were investigated through quantitative analysis of data collected within the extensive student surveys that took place as part of the 2007 and 2009 *CHE ExcellenceRanking.* The results of these surveys have allowed the research questions in this thesis to be evaluated in a large-scale multi-national and multi-institutional context, involving a large sample of both domestic and international graduate students. This thesis can be viewed as an exploratory cross-sectional study, which seeks to advance the understanding of the role of LTRS in international graduate student decision-making.

This chapter discusses the instrument and data collection procedures used for the student survey aspect of the *CHE ExcellenceRanking*. In addition, the resulting sample used in this thesis is explored, along with the extensive data verification and cleanup procedures that took place in order to ensure the reliability of that sample. The dependent and independent variables extracted from the full surveys for use in this thesis are presented. The chapter concludes with an examination of the preliminary statistical analyses undertaken to guide the selection of the most appropriate quantitative analysis tools for use in this project.

6.1 *CHE ExcellenceRanking* Student Survey

In the first phase of the *CHE ExcellenceRanking*[24], European HEIs were indentified for inclusion in the ranking through a pre-selection stage in which HEIs were evaluated on a number of indicators in specific disciplines (Berghoff et al., 2009). In 2007, those disciplines were biology, chemistry, mathematics, and physics. In 2009, economics, political science and psychology were evaluated. In the second stage, identified HEIs were contacted and asked to participate in the institutional and student questionnaires. The questionnaires asked students to evaluate many different aspects of their study program and HEI. The questionnaires were delivered through the Internet, and HEIs chose to have the access instructions sent to students via paper letters or email. Although accessing the survey required a specific code, student anonymity was maintained, and the codes cannot be traced back to individual students.

The number of questions in the surveys was extensive. Some questions were specific to master and doctoral students, while other questions were given to both groups. While the number of questions varied among domestic and international students, as well as among doctoral and master-level students, in order to complete the survey each student responded to

[24] The complete list of selected HEIs can be found at http://www.excellenceranking.org.

over 100 individual question items. Most questions were used in the student evaluation aspects of the *CHE ExcellenceRanking*. However, this thesis represents the first analysis of the survey questions related to the student's choice of a university. Those questions occurred approximately two-thirds of the way through the survey. Although there were some small changes to the survey between 2007 and 2009, the questions selected from the survey to use in this thesis were essentially unchanged, and are presented in Appendix B.

Table 6 shows program participation rates for the 2007 and 2009 *CHE ExcellenceRanking* student surveys. Overall, 56% of programs chosen in the pre-selection process agreed to participate in the student questionnaires. A minimum sample of ten was deemed necessary to include the questionnaire results in the ranking (Berghoff et al., 2009). However, as this thesis is not making evaluations at an institutional level, that number was relaxed slightly, and any HEI with at least six student responses was included in this project's dataset.

Table 6. Number of HEIs Participating in CHE ExcellenceRanking Student Surveys

Discipline	Year of Survey	HEIs included in the *CHE ExcellenceRanking*	HEIs that Participated in the Student Survey	%
Biology	2007	23	14	60.9%
Chemistry	2007	25	12	48.0%
Mathematics	2007	19	7	36.8%
Physics	2007	24	11	45.8%
Economics	2009	69	40	58.0%
Political Science	2009	51	29	56.9%
Psychology	2009	59	38	64.4%
Total[1]		270	151	55.9%
1. Some HEIs were selected in multiple disciplines so this total represents programs rather than HEIs.				

Source: (Berghoff et al., 2009)

Table 7 shows the number of HEIs, as well as the disciplines represented by each country, in this project's final sample. The 2007 sample involved 27 HEIs, compared to 69 in 2009. Some HEIs participated in the students surveys in both years. Thus, in total, 82 HEIs in 19 countries were included in the final sample. In addition to being represented in the *CHE ExcellenceRanking*, the HEIs were also frequently ranked in the two primary global LTRS. Of the 82 HEIs, 62 and 70 were in the top-500 of the 2009 SJTU and THE-QS rankings respectively (SJTU, 2009; THE-QS, 2009). As such a large portion of the sample's HEIs are highly ranked, the survey results provide an excellent dataset to evaluate the importance of LTRS to students at ranked HEIs. However, the dataset may not be representative of students studying at unranked HEIs, who may place different levels of importance on LTRS.

Table 7. Number of HEIs and Disciplines Represented in Sample by Country

Country	HEIs	Biology	Chemistry	Math	Physics	Economics	P. Science	Psychology
Austria	1					X		
Belgium	3	X				X	X	X
Czech Rep.	1					X		
Denmark	1	X		X	X	X	X	
Estonia	1						X	
Finland	2					X	X	X
France	3					X		X
Germany	25	X	X	X	X	X	X	X
Hungary	2					X	X	
Ireland	3					X	X	
Italy	4			X		X	X	X
Netherlands	9	X	X	X	X	X	X	X
Norway	1	X					X	
Poland	1						X	
Portugal	1							X
Spain	4				X	X	X	X
Sweden	4	X				X		X
Switzerland	4	X	X	X	X	X	X	X
UK	12	X	X		X	X	X	X
Total HEIs	82							

While the HEI participation rate in the surveys is known, the overall student response rate is not. With 82 HEIs involved in the student surveys, the overall sampling frame is unclear. As a result, while some HEIs used random or population sampling techniques, the overall dataset presented in this thesis should be considered a convenience sample. This limits the generalizability of this project's findings. However, use of this sample is justified since this project is primarily exploratory in nature, and improves on the very minimal information currently available regarding the role of LTRS in international graduate student choice.

6.2 Data Preparation

All data management preparation tasks as well as subsequent data analysis took place using SPSS version 16.0.2. The results of the surveys were provided as raw data which required substantial cleanup and verification before analysis could begin. With 7250 respondents and over 200 variables in the datasets, this proved to be an extensive task. The original data was in four files, one for master and doctoral students from both the 2007 and 2009 surveys. These files were combined into a single dataset. This involved linking variables, which although related to the same underlying questions in the survey, often had different values associated with the same responses. As an example of the challenges inherent in working with the raw

data, in the 2007 survey students entered their nationality(s) as a text string. This resulted in numerous ways a student could report their nationality. Consequently, the nationality for the nearly 2000 students in the survey had to be recoded into numerical values so that data analysis procedures could be undertaken. In most cases students listed one nationality and the coding was relatively clear. However, others listed multiple nationalities. These nationalities were compared to the student's responses regarding international student status and countries of previous education, to determine which should be coded as their primary nationality.

Once the data was successfully integrated, the complete dataset was investigated for errors related to student data entry or survey design, in order to ensure the integrity and reliability of the dataset before beginning analysis. Most common among the student errors identified were related to confusion regarding international student status. Many of these errors can likely be traced to a misunderstanding of the questions. As the survey was only offered in English, it is possible some students did not fully understand the language used. There was also a problem identified with the 2009 online survey which resulted in "please choose" being recorded as the response for some questions. Rather than simply eliminating any case with an error found in any variable, where possible, discrepancies were investigated based on the student's responses to other questions in the survey. When those other responses provided sufficient evidence, the incorrect response was recoded to reflect the most likely correct choice.

As an example, two students choose their nationality as being "Australian". Those same students also stated they were not international students, noted they were studying at an Austrian HEI, and had completed their higher education entry qualification and bachelor degree in Austria. Clearly the probability that those students were actually Australians was quite low compared to the probability that they had accidently selected Australian rather than Austrian (listed one spot below in the dropdown list). So rather than excluding these cases, or allowing them to remain as Australians, their nationalities were recoded to Austrian. Below is a summary of the changes made and the number of cases represented in each type of change.

Student Data Entry Errors:

- Nationality was changed to match the country of higher education entry qualification for students who stated they were international students, but chose a nationality matching the country of study (n = 18).
- Nationality was changed to match the country of study for students who stated they were not international students, but chose a nationality different than the country of study. Some changes were based on the student's country of higher education entry

qualifications, bachelor and/or master degree (*n* = 45). Other changes were based on the student's second nationality (*n* = 23).
- Students whose chosen country of study did not match their nationality and/or higher education entry qualification were changed to international students (*n* = 79).
- Students selecting international student, but studying in the same country as their cited nationality and entry qualifications were changed to domestic students (*n* = 65).
- Students selecting "19 and under" (default option in survey) were recoded as missing values (*n* = 11), as it is unlikely they were 19-year-old master or doctoral students.

Corrections made to variables with "Please Choose" recorded as the response:

- Nationality was entered based on higher education entry qualifications (*n* = 16).
- Discipline was entered based on the name of the student's degree program (*n* = 13).
- Where conclusive, missing HEIs and country of study were entered based on evidence from the student's program name and/or data collected regarding the IP address, email address, and referring address used to access the survey (*n* = 235).

In addition to the data cleanup and corrections discussed above, individual cases were also evaluated for response validity in order to ensure the final sample selected was as accurate as possible. The total number of cases excluded was 2207, which resulted in a final dataset of 5043 cases. The list below summarizes the reasons individual cases were excluded.

Summary of cases eliminated from raw dataset:

- Respondents who did not complete survey and student choice questions (*n* = 1965).
- Respondents who completed survey but did not answer any choice questions (*n* = 60).
- Respondents who did not select their degree level and as a result were given a list of all university choice factors for both master and doctoral students. Since these students were given a larger set of choices, their evaluations may have varied from other students. In addition, these respondents cannot be separated by degree level (*n* = 28).
- Respondents who did not give their nationality (*n* = 30).
- Respondents from HEIs with less than six total responses (*n* = 12).
- Respondents from survey test accounts (*n* = 4).
- Respondents who completed the survey twice (last survey was kept) (*n* = 2).
- Respondents who exhibited likely response sets (see explanation below) (*n* = 106).

Efforts were made to identify students who did not take the survey seriously. One frequent problem with surveys using attitude scales is that some respondents exhibit response sets. A common response set is that some respondents simply choose the highest or lowest value in the scale without their response being related to the actual question (Hardy and Bryman, 2009). As a result, many surveys use reverse phrasing in designing Likert-type questions to help identify response sets and to encourage respondents to read each question (Hardy and Bryman, 2009). Unfortunately the surveys analyzed in this project did not use this or other strategies to help identify such respondents. This made identification of potentially invalid

cases difficult. As a result, relatively conservative measures were taken to eliminate likely response set cases in order to help eliminate bias they may have introduced in the sample.

The approach taken was based on both the total time the respondent took to complete the survey, and the percentage of the Likert-type questions in the entire survey for which they gave the same response. The complete survey was very extensive and required each student to respond to over 100 questions, including over 70 Likert-type items. A minimum time for inclusion in the final dataset was established at 500 seconds. This represented the lowest 2% of all students who completed the survey. In addition, a maximum threshold of 95% was established for the same response being given by a student to all Likert-type items in the survey. Respondents below the minimum time and/or above the percentage thresholds were excluded from the final dataset. In many cases these groups overlapped and the total number of respondents eliminated was 106.

Although the 2007 and 2009 surveys were combined to facilitate data management, during the preliminary analysis stages, it was quickly evident that responses in the two surveys varied dramatically in regards to the primary dependent variable being investigated in this thesis. Rankings were significantly more important among domestic, international students from the EU/EFTA region, and international students from other nations in the 2009 survey, compared to those in the 2007 survey ($p < .01$). While some of this variation may be related to the disciplines involved in the two surveys, the two-year time difference in the surveys may have also played a major factor. As was discussed in Chapter 3, LTRS, particularly global rankings, are a relatively new phenomenon. As a result, their importance to students may have increased over the past two years. Therefore it is not possible to separate those possible time effects from any potential disciplinary differences between the two surveys. Consequently, the two surveys were treated as separate samples in data analysis. In many cases the analysis of the two surveys are presented side-by-side for space considerations. However, the results are not directly compared, and readers are cautioned to consider them as separate samples.

6.3 Description of the Variables

6.3.1 Dependent Variables

The principal goal of this thesis is to investigate the role of LTRS in international graduate student decision-making. As a result, the primary dependent variable in based on the importance respondents placed on rankings in a survey question which asked them to rate the

importance of various factors in their choice of a university. One of the objectives of research Question 1 was to compare the importance of rankings among those other university choice factors. Those other factors can be seen as secondary dependent variables in this project.

LTRS Rating is an ordinal variable based on responses to the question, “Which factors were important in choosing your university?” “Good ranking results” was one of several factors students were asked to rate in the Likert-type response format shown below. Responses were numerically coded ranging from 6 for very important to 1 for very unimportant. “N/A” and “I don’t know” responses were treated as missing data and not assigned a value.

2007 Rating Scale

very important	important	rather important	rather unimportant	unimportant	very unimportant	I don’t know
○	○	○	○	○	○	○

2009 Rating Scale

very important	important	somewhat important	somewhat unimportant	unimportant	very unimportant	N/A
○	○	○	○	○	○	○

Research has shown that rating scales, such as those above, can be subject to substantial cultural bias when implemented among culturally heterogeneous samples, such as is present in this study. Among those research findings is that respondents from different cultures place varying levels of intensity on the same value in the scale (Cha, Kim and Erlen, 2007; Riordan and Vandenberg, 1994). There are also cultural differences in the tendency to use higher, lower, or middle values in a scale (Cha, Kim and Erlen, 2007; Chen, Lee and Stevenson, 1995; Cheung and Rensvold, 2000; Clarke, 2001; van Herk, Poortinga and Verhallen, 2004). This variability has led some researchers to conclude that differences found between cultural groups in the value placed on a variable measured in an attitude scale, may actually be the result of cultural variability in response style to such scales, rather than an actual difference in value (Clarke, 2001; Heine et al., 2002; van Herk, Poortinga and Verhallen, 2004). In other words, in studies involving multiple cultures, it is difficult to account for the confounding of cultural variability in responses to attitude scales. This makes it difficult to measure actual differences in the value placed on the variable being investigated.

Based on the research presented above, students from different countries in the survey may have varied in their interpretation and use of the rating scale. There may also have had varied cultural inclinations to select, or not select, one of the specific rating options. As a result, the

same response from students from different countries may have been more the result of their cultural differences, than an actual difference in the value placed on rankings. Therefore, in an attempt to detect and account for this potential cultural bias, a dichotomous version of the LTRS Rating variable was created. Respondents choosing one of the three unimportant options were coded as 0 to indicate some level of unimportance. Likewise, respondents selecting one of the three important options were coded as 1. Reducing an ordinal variable to a dichotomy naturally incurs a loss of information. However, since the dichotomous variable treats the three levels of importance or unimportance as equivalent, this may also help negate potential cultural differences in response style. Using both the ordinal and dichotomous variables to make statistical comparisons provides additional support for any variations found or not found in the importance different groups of students in the samples placed on rankings.

Other Factor Ratings are ordinal variables based on the respondent's rating of other factors related to their university choice. The number of factors varied depending on degree level. The full list of factors can be seen in the relevant survey questions to this thesis included in Appendix B. The factors are also presented with the related data analyses in the next chapter.

6.3.2 Independent variables

As minimal previous research has been done into the role of LTRS in international graduate student decision-making, this project can be viewed as exploratory research. As a result, multiple demographic factors are examined in order to do determine if there is any relationship between the factor and the importance specific groups in the sample placed on rankings. The independent variables in this study are based on the demographic information collected from students in the 2007 and 2009 *CHE ExcellenceRanking* student surveys.

Gender is a dichotomous variable in which respondents selected male or female.

Age is an interval variable with a floor and ceiling. Respondents chose their age from a dropdown list which included individual years between 20 and 49. For other ages respondents chose "19 or younger" or "50 or older".

Discipline is a categorical variable based on the respondent's choice of discipline. For the 2007 survey the disciplines represented were biology, chemistry, mathematics, and physics. In 2009 the disciplines were economics, political science, and psychology.

Degree Level is a dichotomous variable. As degree names vary between some countries in the surveys, respondents were given the choice between “Master”, “Another programme leading to the master’s level”, and “Doctorate or equivalent”. The two master levels were combined for this project. Thus this variable indicates master’s or equivalent and doctoral or equivalent.

Country of Study is a categorical variable based on the location of the respondent’s HEI.

International Student is a dichotomous variable based on the question which asked respondents if they were an international student. The question provided the definition of international student as one who “completed your higher education entrance qualification in a different country than you are studying in.”

Nationality is a categorical variable based on the respondent’s stated nationality. Where respondents noted a second nationality, their first stated nationality was used in this project.

EU/EFTA Status is a categorical variable created based on responses to International Student and Nationality. Respondents were divided among those whose nationalities were from the 31 countries in the EU/EFTA region and those from other countries. This resulted in three primary groups which were used in this project: domestic students (all surveyed HEIs are in the EU/EFTA region), international students from EU/EFTA countries, and international students from other countries.

While an argument could be made for combining the two international student groups, there are also reasons to suggest they should be treated separately. Firstly, the EU Treaty provides for the free movement and recognition of qualification for students from the EU studying in another member country (OECD, 2004). The treaty also requires countries to charge the same tuition fees and require the same entry conditions for students from other EU countries as they do for domestic students (OECD, 2004). Thus in some ways EU/EFTA international students represent a middle group between domestic students and those from outside the region. They have some of the benefits of domestic students and do not face the visa challenges, longer geographic distances, and higher tuition fess as most other international students. In addition, previous research in the UK which compared domestic, EU international students, and international students from other countries, showed the three groups varied substantially in the importance of factors related to their decision-making, including LTRS (Connor et al., 1999; Purcell et al., 2008; UCAS, 2008). In addition, the EU/EFTA international student group in this project was larger, and thus may have overshadowed students from outside the

region in the analyses if the groups had been combined. As a result, international students were divided based on whether or not they were from the EU/EFTA region for most analyses.

UNESCO Region is a categorical variable based on respondent's first stated Nationality. This nationality was placed into a group based on the regions in the 2009 UNESCO-UIS Global Education Digest (UNESCO-UIS, 2009). The regions are Arab States, Central and Eastern Europe, East Asia and the Pacific, Latin America and the Caribbean. The region of Central Asia was combined with the South and West Asia region due to their smaller sample sizes.

World Bank Income Level is a categorical variable based on a respondent's first stated Nationality. Students were placed into one of four income groups[25] created by the World Bank based on their nation's 2008 Gross National Income per capita in US$: low ($975 or less), lower middle ($976 - $3,855), upper middle ($3,856 - $11,905) and high ($11,906 or more). This variable provides an alternative way to examine the importance of factors related to respondent's country of origin and can be related to push-pull theories of student mobility.

6.4 Demographics of the Final Sample

Table 8 presents detailed demographic information regarding the two samples. The total international student sample in the 2007 survey was 456, with 58% coming from the EU/EFTA region. In 2009, the total was 774 with 62% from the EU/EFTA region. The two international student groups were fairly similar in regards to degree level, gender, and age in both the 2007 and 2009 survey. There were some differences in regards to discipline. In the 2007 survey, EU/EFTA international students were more likely to be enrolled in chemistry programs, compared to international students from other countries that were more heavily represented in biology and physics. In the 2009 survey, EU/EFTA international students were more likely to be enrolled in political science programs than international students from other countries, who were more frequently enrolled in economics programs.

Table 8 also illustrates the UNESCO region and World Bank income level distributions of the students in the sample. In total there were 74 nationalities represented in the 2007 sample and 98 in the 2009 sample. German students were the most frequent in both surveys, followed by Chinese students. Greek and Italian students were also in the top ten nationalities for both surveys. A full list of nationalities from both samples can be found in Appendix C.

[25] More information on these categories and the full country list are at http://go.worldbank.org/K2CKM78CC0.

Table 8. Demographics Distributions of Student Samples

Demographic Variables	2007 Survey (*n* = 1836)						2009 Survey (*n* = 3207)					
	International Students from EU/EFTA		International Students from other Nations		Domestic Students from EU/EFTA		International Students from EU/EFTA		International Students from other Nations		Domestic Students from EU/EFTA	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Total	266	14.5%	190	10.3%	1380	75.2%	483	15.1%	291	9.1%	2433	75.9%
Degree Level												
Master	63	23.7%	52	27.4%	761	55.1%	288	59.6%	175	60.1%	1822	74.9%
Doctoral	203	76.3%	138	72.6%	619	44.9%	195	40.4%	116	39.9%	611	25.1%
Gender												
Male	149	56.0%	113	59.5%	852	61.7%	238	49.3%	137	47.1%	1015	41.7%
Female	117	44.0%	77	40.5%	518	37.5%	245	50.7%	154	52.9%	1413	58.1%
Not answered					10	0.4%					5	0.2%
Age Groups												
22 or younger	13	4.9%	5	2.6%	131	9.5%	38	7.9%	23	7.9%	433	17.8%
23-25	80	30.1%	64	33.7%	625	45.3%	185	38.3%	102	35.1%	1054	43.3%
26-28	108	40.6%	69	36.3%	387	28.0%	158	32.7%	83	28.5%	491	20.2%
29-31	50	18.8%	29	15.3%	152	11.0%	60	12.4%	33	11.3%	226	9.3%
32-34	9	3.4%	13	6.8%	41	3.0%	25	5.2%	32	11.0%	76	3.1%
35 and older	6	2.3%	10	5.3%	30	2.2%	16	3.3%	18	6.2%	142	5.8%
Not answered					14	1.0%	1	0.2%			11	0.5%
Mean Age/SD	26.8	3.12	27.4	3.94	25.9	3.57	26.5	3.90	27.2	4.45	26.0	5.01
Discipline												
Biology	88	33.1%	73	38.4%	406	29.4%						
Chemistry	111	41.7%	58	30.5%	367	26.6%						
Math	13	4.9%	11	5.8%	172	12.5%						
Physics	54	20.3%	48	25.3%	435	31.5%						
Economics							236	48.9%	162	55.7%	802	33.0%
Political Science							144	29.8%	62	21.3%	440	18.1%
Psychology							102	21.1%	65	22.3%	1184	48.7%
Not answered							1	0.2%	2	0.7%	7	0.3%
UNESCO Region of Origin												
Western Europe[1]	231	86.8%	2	1.1%	1380	100%	382	79.1%	2	0.7%	2268	93.2%
Central and Eastern Europe	35	13.2%	35	18.4%			101	20.9%	53	18.2%	165	6.8%
East Asia and the Pacific			67	35.3%					77	26.5%		
Latin America and Caribbean			29	15.3%					58	19.9%		
Central, South and West Asia			33	17.4%					30	10.3%		
North America			11	5.8%					38	13.1%		
Sub-Saharan Africa			8	4.2%					21	7.2%		
Arab States			5	2.6%					12	4.1%		
World Bank Income Level												
High	237	89.1%	30	15.8%	1380	100%	416	86.1%	63	21.6%	2408	99.0%
Upper Middle	29	10.9%	54	28.4%			67	13.9%	83	28.5%	25	1.0%
Lower Middle			96	50.5%					111	38.1%		
Low			10	5.3%					34	11.7%		

1. The Western European region includes nations that are not members of the EU or EFTA. Thus there are students from Israel (*n* = 3) and San Marino (*n* = 1) that are in the Western Europe region but not in the EU/EFTA group.

From a country of study perspective, the HEIs in the 2007 sample were located in 10 EU/EFTA countries, compared to 19 in the 2009 sample. In both samples, students were concentrated in Germany, the Netherlands, Switzerland, and the UK. Those countries hosted 85% and 60% of the total internationals students in the 2007 and 2009 samples respectively. The full list of countries of study and the number of students hosted is located in Appendix D.

6.5 Choice of Data Analysis Methods

There is much debate as to whether attitude scales, such as the one used in the student choice question evaluated in this thesis, should be treated as interval or ordinal data (Hardy and Bryman, 2009; Harwell and Gatti, 2001; Wright, 1997). The arguments between statisticians regarding ordinal versus interval data have been ongoing for over 50 years, and no clear consensus has yet been reached (Harwell and Gatti, 2001). While strictly speaking, the results of such scales are ordinal, it has become common practice to treat the data as interval. This practice makes an assumption that the distances between options in the scale are relatively equal. This is done to allow the use of more well-known parametric statistical procedures such as *t*-tests, one-way ANOVA, Pearson's *r* correlation, and multiple regression (Blaikie, 2003; Hardy and Bryman, 2009; Levin, Fox and Forde, 2010; Wright, 1997). However, those parametric procedures have assumptions that must be met in order to ensure their validity. Common to those procedures is the assumption of interval data, as well as a normal distribution (Levin, Fox and Forde, 2010). In addition, *t*-tests and one-way ANOVA have an assumption of equal variances among groups being compared (Levin, Fox and Forde, 2010).

While the literature provides no definitive guidelines on treating the student choice data in this project as interval or ordinal, normality and equal variances can be statistically tested. In order to check for normality in this study's samples, six Kolmogorov-Smirnov tests were conducted, three for each of the 2007 and 2009 surveys. These tests compared the normality of responses to the LTRS Rating question among the domestic, EU/EFTA international students and international students from other countries groups. In all six groups, responses were found to be significantly different than normal at the $p < .001$ level. The homogeneity of variance between the three groups was conducted using the Brown-Forsythe's test, which is the preferred test when the sample sizes of the groups being compared are unequal (Sheng, 2008). For both the 2007 and 2009 survey the test showed variances to be significantly unequal at the $p < .001$ level.

As the data being analyzed in this project clearly violated two of the primary assumptions of parametric statistical analysis, the issue of whether or not to treat the LTRS Rating data as interval became somewhat moot. As a result, data analysis in this study relied on non-parametric statistical techniques in the bivariate comparisons and in the regression analysis. While parametric tests are generally considered more powerful than non-parametric tests, that advantage is often nullified when violations of the underlying assumptions of those tests occur (Sheskin, 2004). Consequently, the choice was made to use the Mann-Whitney *U* test and the Kruskal-Wallis *H* test, which are designed for use with ordinal data and are the primary non-parametric equivalents to the *t*-tests and one-way ANOVA (Sheskin, 2004).

Bivariate analyses were also conducted using the dichotomous version of the LTRS Rating variable. Comparisons between dichotomous and categorical variables are often done with the Chi-Square test. While that test is non-parametric, it does have a minimum size assumption (Sheskin, 2004). In the sub-samples examined in this thesis, there were numerous occasions where the number of students rating rankings at some level of unimportance was too small to satisfy that assumption. As a result, Fisher's Exact Test was used. This test does not require a minimum size, and as its name implies, it returns an exact probability value, rather than the Chi-Square's estimated value (Sheskin, 2004). The dichotomous version of the LTRS Rating variable was also used in the binary logistic regression in the multivariate analysis stage.

In regards to descriptive statistics, a middle-road approach was taken in defining the LTRS Rating variable. For ordinal data, contingency tables and medians are normally presented as descriptive statistics. However, the number of comparisons being made in this thesis is rather large. As a result, presenting full contingency tables for all six possible choices on the LTRS Rating scale for the many sub-samples being examined would quickly become unwieldy for both the author and reader. In addition, most sub-samples placed a high level of importance on rankings, resulting in medians that were often the same. Consequently, for space considerations and in order to facilitate readability and comparisons between sub-samples, it was decided to present means and standard deviations, as well as the percentage of students in each group that placed some importance on rankings, as the primary descriptive statistics.

Chapter 7: Data Analysis and Relating Findings to Prior Research

This chapter presents results of the analyses conducted to investigate this project's research questions. The first section concentrates on bivariate analyses between various demographic groups in the 2007 and 2009 student samples. The second section relates the findings from the multivariate analysis conducted using binary logistic regression. The tables presented in this chapter convey a large amount of data. Rather than commenting on all aspects of the results, the discussion of findings will instead focus on the significant differences found between and among the various groups in the samples. The findings are also related to the previous research discovered during the literature review. The summary and conclusions regarding the major findings from the analyses are presented in the concluding chapter.

The overall alpha level for this project was set at $\alpha < .05$ and in all cases two-tailed significance tests were used. However, since the risk of Type I errors increases when making multiple post hoc comparisons between sub-groups, Bonferroni corrections were used to maintain the project's alpha level when making those comparisons. Bonferroni corrections are made by dividing the overall alpha level by the number of comparisons (Howell, 2008). As an example, when comparing the variation in the importance placed on rankings among the three disciplinary groups in the 2009 sample, in order for that variation among the groups as a whole to be significant, the probability value must be < .05. Yet, when comparing the three groups to determine if any group varies significantly from another group, three comparisons are made and thus the Bonferroni corrected alpha level for those comparisons is $\alpha < .017$.

The bivariate analyses in this chapter rely on three primary tests. Fisher's Exact (FE) tests were used to determine the significance of the variation in the dichotomous version of the student choice factor variables. The dichotomous variables divided respondents into two groups; those who placed some level of importance on the factor and those that did not. For comparisons using the ordinal version of the choice factor variables, Mann-Whitney (MW) tests were used when two groups were compared. Kruskal-Wallis (KW) tests were used when there were more than two groups. Considering the distributions of responses and sample sizes in many of these comparisons, the asymptotic method of estimating significance values was not preferred (Field, 2009). However, the comparisons were also too complex for computer calculation of exact significant values. Consequently, significance values for the MW and KW tests were calculated using the Monte Carlo method with one million samples.

7.1 Research Question 1. Does the importance of LTRS and other student choice factors vary between domestic and international graduate students?

This research question was addressed through statistical comparisons between the three primary groups of graduate students created from the dataset. Those groups are domestic students, international students from the EU/EFTA region, and students from countries outside that region. In addition, since the choice factors given to students varied depending on degree level, those groups were also divided into master and doctoral-level student groups. The importance of rankings and other HEI choice factors among master-level students in both the 2007 and 2009 sample is presented first, followed by the doctoral level comparisons.

The primary goal of this thesis is to investigate the importance of rankings in international graduate student decision-making. However, as was seen in the literature review, rankings are one of many factors students consider when choosing a HEI. Thus to place rankings in the context of those other factors, the importance respondents placed on other factors in the surveys are also integrated into the analysis for this research question. While those other factors are not examined in the same level of detail as rankings, differences among the three students groups are summarized at the end of this section.

Each table in this section includes a summary of the KW tests conducted for significant difference among the three groups. When that test proved significant, MW tests were conducted between the three groups using the Bonferroni corrected alpha level of $\alpha < .017$. The results of the KW tests were compared with Fisher's Exact (FE) tests using the dichotomous version of the LTRS Rating variable. However, in only two of those 36 tests did a significant result from the KW tests become insignificant using the FE tests or vice versa. Neither case involved rankings. Consequently, the results of those tests are not discussed in this section. However, the two exception cases are noted in the appropriate tables.

In many cases sample sizes for the choice factors vary. This is due to the fact that some students may have selected the N/A option, or chose not to rate a particular factor. Also note that the description of the factors in the tables is exactly as they were presented to respondents with one exception. The factor "subject-specific reasons" also included the phrase "e.g. fields of study which can only be studied at your university or can be studied there particularly well." In the tables, the rankings factor is presented first. Other factors are presented in order based on their mean score among the EU/EFTA international graduate student group.

7.1.1 Comparison Tables of the Importance Respondents Placed on Choice Factors

Table 9 summarizes the importance master-level students in the 2007 sample placed on the included choice factors. KW tests were significant at the < .001 level for all factors except "Attractive location of university" and "Relatives/partner/friends at place of university". In the MW comparisons between groups, master students from outside the EU/EFTA region placed significantly more importance on rankings than the domestic and EU/EFTA international master students ($p < .001$ and $p = .001$ respectively). The latter group's mean rating of rankings was higher than domestic students, but not significant ($p = .116$).

Table 9: Importance of Student Choice Factors - 2007 Survey – Master-Level Students

Which factors were important in choosing your university?	**2007 Survey: Master or Equivalent Students (biology, chemistry, math, and physics)**										
	A: International Students from EU/EFTA (*n* = 63)			**B: International Students from other Nations (*n* = 52)**			**C: Domestic Students from EU/EFTA (*n* = 761)**			**Kruskal-Wallis Test (A,B,C)**	**Mann-Whitney Pair Comparisons**
	Mean (SD)	**% Imp.**	***n***	**Mean (SD)**	**% Imp.**	***n***	**Mean (SD)**	**% Imp.**	***N***	**$X^2_{K\text{-}W}$ (sig.)**	**α < .017**
Good ranking results	4.59 (1.18)	88%	58	5.24 (1.06)	94%	50	4.21 (1.48)	71%	711	**28.234 < .001**	B > A B > C
Good reputation of university and professors	5.23 (0.90)	95%	61	5.63 (0.63)	100%	52	5.00 (1.10)	91%	749	**22.750 < .001**	B > A B > C
Subject-specific reasons	5.21 (1.08)	92%	63	5.56 (0.85)	98%	52	4.90 (1.24)	88%	742	**20.956 < .001**	B > C
For international students: Language/ country of university[1]	4.57 (1.39)	78%	53	5.09 (1.14)	94%	47	3.67 (1.66)	57%	108	**30.822 < .001**	A > C B > C
Attractive location of university	4.13 (1.29)	74%	62	4.06 (1.42)	71%	52	3.89 (1.47)	65%	751	1.795 (.411)	
Relatives/partner/friends at place of university	2.61 (1.72)	30%	61	2.73 (1.63)	29%	51	3.00 (1.69)	38%	745	4.413 (.110)	
Close distance to home town	2.28 (1.34)	20%	61	2.37 (1.40)	21%	52	3.82 (1.69)	61%	755	**72.861 < .001**	C > A C > B
Other			3			4			31		

1. Note that some domestic students rated this factor despite its phrasing stating it was for international students.

Table 10 summarizes results from the analysis of student choice factors using the 2009 master-level student sample. Similarly to the 2007 master student sample, respondents from the three groups varied significantly in the importance placed on all but one factor; "Attractive location of university." In looking at the importance of rankings, the variation

between the three groups was somewhat different than in 2007. International master students from outside the EU/EFTA region again rated rankings higher than their domestic counterparts ($p < .001$), but not significantly higher than the EU/EFTA international master student group ($p = .302$). The EU/EFTA international master student group in this sample did however, rate rankings as more important than domestic master students ($p < .001$).

Table 10: Importance of Student Choice Factors - 2009 Survey – Master-Level Students

Which factors were important in choosing your university?	**2009 Survey: Master or Equivalent Students (economics, political science, and psychology)**										
	A: International Students from EU/EFTA (*n* = 288)			**B: International Students from other Nations (*n* = 175)**			**C: Domestic Students from EU/EFTA (*n* = 1822)**			**Kruskal-Wallis Test (A,B,C)**	**Mann-Whitney Pair Comparisons**
	Mean (SD)	**% Imp.**	***n***	**Mean (SD)**	**% Imp.**	***n***	**Mean (SD)**	**% Imp.**	***n***	$X^2_{K\text{-}W}$ **(sig.)**	**α < .017**
Good ranking results	4.97 (1.28)	90%	277	5.14 (1.10)	92%	170	4.38 (1.44)	76%	1755	**91.418 < .001**	A > C B > C
Good reputation of university and professors	5.42 (0.88)	96%	284	5.51 (0.82)	97%	174	5.06 (1.08)	92%	1796	**65.605 < .001**	A > C B > C
Subject-specific reasons	5.28 (1.01)	95%	283	5.32 (0.86)	98%	170	4.99 (1.18)	90%	1780	**24.294 < .001**	A > C B > C
Language/country of university	4.75 (1.44)	84%	283	5.02 (1.25)	89%	171	4.24 (1.57)	75%	1651	**71.291 < .001**	A > C B > C
Attractive location of university	3.88 (1.50)	66%	284	4.15 (1.49)	75%	167	3.99 (1.50)	68%	1782	4.251 (.119)	
Relatives/partner/friends at place of university	2.52 (1.66)	29%	267	2.72 (1.67)	36%	158	3.04 (1.66)	42%	1752	**31.194 < .001**	C > A C > B
Close distance to home town	2.46 (1.63)	28%	281	2.45 (1.61)	28%	155	3.62 (1.72)	58%	1794	**151.188 < .001**	C > A C > B
Other			30			15			119		

Doctoral students in the two surveys were given a larger list of choice factors. Table 11 shows the varying levels of importance the three doctoral student groups in the 2007 sample placed on that list of factors. Similarly to master students, doctoral students varied significantly in the importance placed on every factor except: “Attractive location of university.” International doctoral students from outside the EU/EFTA region placed significantly higher importance on rankings than the domestic and EU/EFTA international groups (both $p < .001$). While the mean score for rankings among the EU/EFTA international group was higher than domestic students, that difference was over the Bonferroni corrected alpha level of $\alpha < .017$ ($p = .019$).

Table 11: Importance of Student Choice Factors - 2007 Survey – Doctoral-Level Students

Which factors were important in choosing your university?	2007 Survey: Doctoral or Equivalent Students (biology, chemistry, math, and physics)										
	A: International Students from EU/EFTA (*n* = 203)			B: International Students from other Nations (*n* = 138)			C: Domestic Students from EU/EFTA (*n* = 619)			Kruskal-Wallis Test (A,B,C)	Mann-Whitney Pair Comparisons
	Mean (SD)	% Imp.	*n*	Mean (SD)	% Imp.	*n*	Mean (SD)	% Imp.	*N*	$X^2_{K\text{-}W}$ (sig.)	α < .017
Good ranking results	4.03 (1.53)	63%	187	4.77 (1.14)	87%	128	3.75 (1.48)	59%	582	**51.325 < .001**	B > A B > C
Quality of research in the field[1]	5.48 (0.75)	98%	197	5.48 (0.79)	97%	138	5.14 (0.94)	95%	605	**37.075 < .001**	A > C B > C
Specialisation in research	5.32 (0.75)	98%	197	5.26 (0.86)	95%	137	4.88 (1.04)	90%	594	**38.808 < .001**	A > C B > C
Previous contact to the supervisor[1]	5.05 (1.06)	92%	195	5.34 (0.81)	96%	134	4.97 (1.16)	90%	602	**9.570 (.008)**	B > C
Reputation of the supervisor	4.97 (1.13)	89%	197	5.21 (0.96)	95%	136	4.68 (1.23)	82%	594	**27.44 < .001**	A > C B > C
Good reputation of university and professors	4.67 (1.33)	81%	199	4.91 (1.11)	89%	136	4.42 (1.30)	79%	606	**21.118 < .001**	A > C B > C
Quality of research at the university as a whole	4.66 (1.24)	82%	199	4.91 (1.06)	91%	133	4.25 (1.33)	72%	602	**35.949 < .001**	A > C B > C
Attractive location of university	3.91 (1.43)	65%	195	3.67 (1.62)	59%	128	4.03 (1.47)	68%	604	5.424 (.066)	
Relatives/partner/friends at place of university	2.87 (1.74)	34%	190	2.95 (1.62)	38%	127	3.54 (1.70)	53%	601	**27.875 < .001**	C > A C > B
Previously awarded Diploma or Masters degree here	2.82 (1.76)	33%	169	3.03 (1.73)	35%	112	3.60 (1.76)	55%	574	**28.255 < .001**	C > A C > B
Other			8			16			30		

1. The results of the Fisher's Exact test using the % Important variable were not significant at the $p < .05$ level.

Table 12 compares the choice factors among doctoral students in the 2009 sample. Again the groups varied significantly in the importance of every choice factor other than "Attractive location of university." In regards to rankings, similarly to the 2009 master student sample, both the EU/EFTA and Other international doctoral student groups rated rankings as significantly more important than their domestic counterparts (both $p < .001$). However, the two international student groups did not vary significantly from each other ($p = .298$).

Table 12: Importance of Student Choice Factors - 2009 Survey – Doctoral-Level Students

Which factors were important in choosing your university?	2009 Survey: Doctoral or Equivalent Students (economics, political science, and psychology)										
	A: International Students from EU/EFTA (*n* = 195)			B: International Students from other Nations (*n* = 116)			C: Domestic Students from EU/EFTA (*n* = 611)			Kruskal-Wallis Test (A,B,C)	Mann-Whitney Pair Comparisons
	Mean (SD)	% Imp.	*n*	Mean (SD)	% Imp.	*n*	Mean (SD)	% Imp.	*n*	$X^2_{K\text{-}W}$ (sig.)	α < .017
Good ranking results	4.90 (1.41)	87%	189	5.19 (0.98)	95%	112	4.36 (1.54)	76%	585	**43.094 < .001**	A > C B > C
Good reputation of university & professors	5.54 (0.78)	98%	194	5.65 (0.60)	99%	114	5.16 (1.10)	94%	606	**39.832 < .001**	A > C B > C
Quality of research in the field	5.26 (0.99)	94%	189	5.55 (0.67)	99%	113	5.01 (1.23)	88%	594	**22.739 < .001**	B > C
Specialisation in research	4.98 (1.17)	90%	189	5.37 (0.92)	97%	112	4.90 (1.25)	88%	600	**15.181 < .001**	B > A B > C
Reputation of the supervisor	4.96 (1.30)	87%	182	5.41 (0.88)	96%	113	4.94 (1.26)	88%	586	**14.088 (.001)**	B > A B > C
Quality of research at the university as a whole	4.67 (1.44)	81%	189	5.04 (1.22)	90%	113	4.36 (1.52)	75%	594	**24.904 < .001**	A > C B > C
Previous contact to the supervisor	3.83 (1.99)	60%	154	4.56 (1.73)	76%	100	4.58 (1.60)	78%	543	**16.437 < .001**	B > A C > A
Language/country of university	3.81 (1.69)	63%	191	5.01 (1.30)	89%	109	4.08 (1.59)	67%	579	**45.813 < .001**	B > A B > C
Attractive location of university	3.50 (1.66)	53%	191	3.62 (1.61)	63%	105	3.75 (1.52)	62%	594	2.979 (.225)	
Previously awarded Diploma or Masters degree here	2.52 (1.91)	30%	154	3.47 (2.03)	51%	89	3.81 (1.83)	60%	545	**50.235 < .001**	B > A C > A
Relatives/partner/friends at place of university	2.25 (1.61)	22%	189	2.29 (1.64)	23%	102	3.29 (1.72)	48%	590	**73.148 < .001**	C > A C > B
Close distance to home town	1.98 (1.32)	17%	189	2.15 (1.49)	23%	99	3.54 (1.73)	58%	597	**139.36 < .001**	C > A C > B
Other			14			7			32		

7.1.2 Summary of the Relative Importance of Student Choice Factors

One clear result of the four comparison tables presented above was the substantial variation between the three groups of students examined. Of the 36 KW comparisons in those tables, in only five cases were the groups not significantly different in the importance placed on the particular factor. In four of those cases, “Attractive location of university” was not significantly different among doctoral or master students in both the 2007 and 2009 samples.

There was also substantial consistency in the results of the comparisons between the three students groups. International master-level students from outside the EU/EFTA region rated rankings, HEI reputation, subject-specific reasons, and the language and/or country of the university as significantly more important than domestic students in both the 2007 and 2009 samples. The EU/EFTA international master student group mean was also higher than domestic students for each of those factors. However, in the 2007 sample, the difference in importance was not significant for rankings, HEI reputation, and subject-specific reasons. Domestic students in turn placed significantly more importance on distance to their home town than both international student groups in both surveys. Having relatives or friends at the location of the HEI was also significantly more important to domestic master students than the two international master student groups in the 2009 sample.

Among doctoral students in both samples, those from outside the EU/EFTA region rated the following factors as significantly more important than domestic students: rankings, HEI reputation, quality of research in the field, quality of research at the HEI, research specialization, and supervisor reputation. EU/EFTA international doctoral students rated HEI reputation and quality of research at the HEI as more important than domestic doctoral students in both samples. Domestic doctoral students on the other hand, cited having relatives or friends at the location of the HEI as significantly more important than both international student groups in 2007 and 2009. They also placed more importance on distance to their home town in 2009 (only the 2009 survey included this factor for doctoral students). Analysis also showed domestic students rated having a previous master-level degree from the HEI as significantly more important than EU/EFTA international students in both surveys.

In most cases, comparing the two international student populations showed few significant differences in the importance placed on the various choice factors. In the 2007 sample, master students from outside the EU/EFTA region placed more importance on rankings and HEI reputation than international master students from the region. No other significant differences were found between the two international master groups in the 2007 or 2009 samples. Results for the 2007 doctoral sample were similar, with international doctoral students from outside the EU/EFTA region placing more importance on rankings than international students from within the region. The 2009 sample, however, saw five categories where the international doctoral groups varied significantly: research specialization, supervisor reputation, previous contact with supervisor, previous degree at the HEI, and the language/country of the HEI.

Taken as a whole, the results of the analysis suggests that international students in the sample placed more importance on reputational and quality related factors such as rankings, HEI reputation, and the quality of research than domestic students. Domestic students in turn placed more importance on location specific factors, such as the distance of the HEI to their home town, having relatives/partner or friends at the HEI, and having secured a previous degree at the institution. Also of note were the few significant differences found between international students from the EU/EFTA region and those from other countries. The only significant difference in more than one of the four tables presented was rankings, which were rated higher by master and doctoral students from outside the region in the 2007 sample.

7.1.3 Relating Student Choice Factors Findings to Previous Studies

Across all twelve groups compared, nearly two-thirds of the factors evaluated had mean scores of four or above, indicating the factor has some level of importance in the choice of a HEI by students in the sample. Consequently, it appears that most students took into account a wide range of factors in selecting their HEI. This is consistent with the findings from the previous domestic and graduate student studies presented in the literature review.

That review also showed that while location related factors were frequently cited as important in domestic graduate student choice, they were not among the most important factors in the three previous international graduate student studies (Chen, 2007a; 2008; Mulvey and Langer, 2003; Ruby, 2007). Thus the findings in this thesis are consistent with previous research; domestic students in both samples were more likely than international students to rate as important the distance of the HEI to their home and having relatives and friends in the place of the HEI. However, it should be noted that those two factors were among the lowest rated to domestic students in this project. This is inconsistent with the research reviewed, which showed location was commonly a highly-rated factor for domestic graduate students.

The review of previous studies showed two choice factors that were frequently cited for both domestic and international graduate students: reputation of the HEI and factors related to the financial aid/campus employment package offered. Unfortunately the latter factor was not included in the two surveys. HEI reputation was included, and was the highest rated factor for domestic and both international master student groups in the 2007 and 2009 samples. HEI reputation was also the highest rated factor for all three groups of doctoral students in the 2009 sample. Conversely, it was only the 5th highest rated factor for the three doctoral groups in the 2007 sample. Those three groups rated the quality of research in the field, research

specialization, previous contact to the supervisor, and supervisor reputation, as more important than HEI reputation. Those factors were not included in the master surveys, so direct comparisons are not possible. However, the difference in the relative position of HEI reputation suggests that degree level may play a role in the importance of decision-making factors for students in the natural sciences and mathematics.

Only one study was found which directly compared different choice factors between domestic and international graduate students (Mulvey and Langer, 2003). In that study the authors found substantial variation between domestic and international astronomy and physics graduate students. This is consistent with the findings of this thesis which showed domestic students varied significantly from at least one international student group in almost every factor examined. In addition, the findings of this project, that international students placed more importance on HEI reputation, was also found by Mulvey and Langer.

Most previous studies identified in regards to rankings compared domestic and international undergraduate students, and found the groups differed in the importance placed on LTRS (Connor et al., 1999; McDonough et al., 1998; Purcell et al., 2008; UCAS, 2008). However, this thesis possibly represents the first study to use the same survey to investigate potential differences in the importance of LTRS among domestic and international graduate students. Consequently, there was no previous research found with which to compare these results.

There was substantial consistency in the mean scores of the importance placed on rankings among the three groups examined. For both master and doctoral students in the 2007 and 2009 samples, international students from outside the EU/EFTA region placed the highest importance on rankings, followed by EU/EFTA international students, and lastly domestic students. In all cases, KW tests showed the differences between the domestic and international students from outside the EU/EFTA region were statistically significant (all $p < .001$). In addition, both master and doctoral international students from the EU/EFTA region in the 2009 survey rated rankings as significantly more important than their domestic counterparts (both $p < .001$). In the 2007 sample, the difference between those same groups at the master level was not significant ($p = .116$). However, the difference between doctoral students was just over the Bonferroni corrected alpha value of .017 ($p < .019$). In the 2007 sample, both master and doctoral-level international students from outside the EU/EFTA region placed a significantly higher value on rankings than their EU/EFTA international student counterparts ($p = .001$). Taken together the results of this thesis suggest that international students in both

samples, particularly those from outside the EU/EFTA region, placed more importance on rankings in their choice of a HEI than domestic students.

7.2 Research Question 1a. How does the importance of LTRS compare to other student choice factors?

Table 13 presents an alternative comparison based on the ranked importance each of the twelve groups placed on the choice factors in the surveys. The factors are ranked based on the mean rating using the ordinal version of the choice factor's variable. The factors were also ranked based on the percentage of respondents who placed some level of importance on each factor. However, as those results were nearly identical to the ordinal version (no factor changed in rank by more than one place) results of those comparisons are not presented.

Table 13: Ranked Summary List of Student Choice Factors - 2007 and 2009 Surveys

Which factors were important in choosing your university?	2007 Survey Master Groups			2009 Survey Master Groups			2007 Survey Doctoral Groups			2009 Survey Doctoral Groups		
	A	B	C	A	B	C	A	B	C	A	B	C
Good reputation of university and professors	1	**1**	1	**1**	**1**	1	**5**	**5**	5	**1**	**1**	1
Subject-specific reasons	2	**2**	2	**2**	**2**	2	NA	NA	NA	NA	NA	NA
Good ranking results	3	**3**	3	**3**	**3**	3	7	**7**	8	**5**	**5**	6
Language/country of university	**4**	**4**	6	**4**	**4**	4	NA	NA	NA	7	**8**	8
Attractive location of university	5	5	4	5	5	5	8	8	7	9	9	10
Relatives/partner/friends at place of university	6	6	**7**	6	6	**7**	10	9	**10**	11	11	**12**
Close distance to home town	7	7	**5**	7	7	**6**	NA	NA	NA	12	12	**11**
Quality of research in the field							**1**	**1**	1	2	**2**	2
Specialisation in research							**3**	**2**	3	4	**3**	4
Previous contact to the supervisor							2	**3**	2	8	7	5
Reputation of the supervisor							**4**	**4**	4	3	**4**	3
Quality of research at the university as a whole							**6**	**6**	6	**6**	**6**	7
Previously awarded Diploma or Masters degree here							9	10	**9**	10	10	9

A: International Graduate Students from the EU/EFTA Region
B: International Graduate Students from other Nations
C: Domestic Graduate Students from the EU/EFTA Region

Table 13 demonstrates that despite the large number of significant differences found among the three groups when looking at individual choice factors, when those factors are shown in relation to other factors included in the surveys, there is much less variation. As an example, the three groups of master students varied significantly in the level of importance placed on HEI reputation, subject-specific reasons, and rankings in both the 2007 and 2009 samples. However, in both samples those factors had the same ranked importance to all three groups:

(1) HEI Reputation, (2) subject-specific reason, and (3) rankings. At the doctoral level, there was slightly more variation in the top factors. Nevertheless, in both the 2007 and 2009 samples, the three doctoral student groups in those samples had the same four top ranked factors, and no factor was more than one place higher or lower among the groups.

When looking at the importance placed on rankings as an individual choice factor, there was significant variation between master students in both the 2007 and 2009 samples. However, when looking at the importance of rankings compared to other choice factors in the survey, it was ranked 3rd by all six master student groups. There was somewhat more variation among doctoral students. While rankings was the same ranked factor for the two international doctoral student groups in each sample, in both samples the mean value placed on rankings by domestic students was ranked just one place lower.

The placement of rankings compared to the other student choice factors can also be compared to previous research. In this project, eleven of the twelve student groups examined in this summary rated rankings as a mid-level factor in their choice of a HEI. All six master-level student groups rated rankings as their 3rd most important out of 7 choice factors. In comparison, for the two international doctoral student groups, rankings were 7th out of 10 factors in 2007 and 5th out of 12 factors in 2009. Domestic doctoral students also placed rankings as a mid-level choice factor in 2009; 6th out of 12. However, the 2007 domestic doctoral group was a lower-level factor; 8th out of 10.

These findings are generally consistent with the results of the previous studies found in the literature review. Those studies showed that rankings ranged from a low to mid-level factor in domestic undergraduate and graduate student contexts (Hachmeister and Hennings, 2007; Heine et al., 2008; HERI, 2007; McDonough et al., 1998; Pivo, 2005; Purcell et al., 2008; UCAS, 2008; UNITE, 2006b). Rankings were a mid-level factor in two studies found which included a mixture of international and domestic MBA students (GMAC, 2009; Quacquarelli and Geraghty, 2008). Comparatively, in the studies that included international students, rankings were generally found to be a mid to high-level factor (Cantwell, Luca and Lee, 2009; Chen, 2007a; 2008; Purcell et al., 2008; Rawson, 2004; UCAS, 2008). Unfortunately, of those studies only those by Pivo and Chen were clearly specific to domestic and international graduate students respectively. Pivo's study was consistent with the results of this thesis and showed rankings as a mid-level choice factor for domestic students in the US. Chen's study only included East Asian graduate students in Canada. Those students rated rankings as a

higher-level choice factor. This is also consistent with the results of this thesis which showed rankings were very important to students from the East Asia and the Pacific region. However, those results are not directly comparable to this project overall, since this thesis is the first study to examine the importance of LTRS in relation to other international graduate student choice factors among students from a wider geographic perspective.

In reviewing the individual choice factors in all four tables presented, the two international student groups had higher mean scores for substantially more factors than domestic students. Combined among the 2007 and 2009 samples the international master-level students rated the factor as more important than their domestic counterparts in 19 of 28 possible comparisons (13 significantly). In comparison, domestic master students rated only 9 comparisons of factors as more important either of the two international master-level groups (6 significantly). The differences were also pronounced among doctoral students. The two doctoral international student groups rated the factor as more important than domestic students in 27 of 44 possible comparisons (22 significantly). For domestic doctoral students the number was 16 of the 44 possible comparisons (10 significantly). These differences suggest substantial variation in the importance of the individual choice factors between international and domestic students. Yet, the ranked lists presented in Table 13 suggest the variation in importance of the factors was not as pronounced when considered in relation to other factors. This difference is somewhat puzzling. However, one possible explanation can be offered.

It is possible that the importance of the included choice factors relative to other factors was quite similar among the international and domestic students in the two samples. It is also possible that many individual factors weigh more heavily in the decision-making process when students are studying internationally. As an example, HEI reputation, subject-specific reasons, and rankings were ranked 1-2-3 for the domestic and international master students in both the 2007 and 2009 sample. Yet in all but one of those twelve cases, international students rated the factor as significantly more important than domestic master students. So in other words, the relative importance of those three factors was the same among the three groups. Yet, the intensity of that importance was higher for the international master student groups.

Therefore, the higher level of importance placed on most factors by international students, may not actually be primarily the result of that factor being more important. Instead the higher levels of importance may be the result of the overall decision-making process for international students being more intensive. In other words, compared to domestic students, the choice of a

HEI may be a higher-stakes decision (e.g. personally, culturally, and/or financially) for international students resulting in that group considering each factor more carefully in their choice. Unfortunately very minimal research has been conducted into understanding differences in the decision-making process between international and domestic students. So while many studies, such as this thesis, have shown strong differences in the importance of individual choice factors among those two groups, those differences may actually be more related to inherent differences in the decision-making process of the groups, rather than the factors actually having substantially more importance to one group or another. As a result, this area would greatly benefit from additional research to determine if the differences in the importance of various choice factors between international and domestic students should be attributed more too true differences in value of the specific factors, or to the intensity of choosing a HEI abroad compared to one domestically.

7.3 Research Question 2. Are LTRS more important to different international graduate student sub-populations?

Since the two international student groups did vary in the importance placed on the various choice factors examined in the previous section, including rankings, the separation between international graduate students (hereafter IGS) from the EU/EFTA region (hereafter EU/EFTA) and those from other countries (hereafter Other) was retained for most comparisons in this section. As this research project is primarily exploratory in nature, each demographic category available from the surveys was examined. This was done to determine if there was a relationship between respondents in the categories, and the level of importance they placed on rankings. This section presents the analysis conducted for each research sub-question and relates that analysis to the previous research discovered in the literature review.

7.3.1 Research Question 2a. Degree Level (master and doctoral)

Table 14 compares the importance placed on rankings among international students based on degree level. The results from the 2007 and 2009 samples were mixed. For the 2007 sample, MW tests using the ordinal version of the LTRS Rating variable showed master students in both the EU/EFTA IGS and Other IGS groups placed significantly more importance on rankings than doctoral students. However, while the difference remained significant using the FE tests of the dichotomous version of the variable for EU/EFTA IGS, the difference between master and doctoral students in the Other IGS group was no longer significant. This suggests some potential cultural bias in the use of the rating scale for that group. Consistent with the

overall difference between the EU/EFTA and Other IGS groups, both master and doctoral students in latter group placed significantly higher importance on ranking than their EU/EFTA IGS counterparts. In contrast, no significant differences were found for the 2009 sample in any of the comparisons between or among master and doctoral students in the EU/EFTA or Other IGS groups. As a result, the two samples have contradictory findings.

Table 14: Demographic Comparisons of the Importance of Rankings: Degree Level

Degree Level	**2007 Survey (biology, chemistry, math, physics)**							**2009 Survey (economics, pol. science, psychology)**						
	International Students from EU/EFTA (*n* = 245)			**International Students from other Nations (*n* = 178)**			**EU/EFTA vs. Other**	**International Students from EU/EFTA (*n* = 466)**			**International Students from Other Nations (*n* = 282)**			**EU/EFTA vs. Other**
	LTRS Rating			**LTRS Rating**			**α < .025**	**LTRS Rating**			**LTRS Rating**			**α < .025**
	Mean (SD)	**% Imp.**	***n***	**Mean (SD)**	**% Imp.**	***n***	**Z_{M-W} *p***	**Mean (SD)**	**% Imp.**	***n***	**Mean (SD)**	**% Imp.**	***n***	**Z_{M-W} *p***
Master	4.59 (1.19)	88%	58	5.24 (1.06)	94%	50	**-3.289 .001**	4.97 (1.28)	90%	277	5.14 (1.10)	92%	170	-1.032 .302
Doctoral	4.03 (1.53)	63%	187	4.77 (1.14)	88%	128	**-4.130 < .001**	4.90 (1.41)	87%	189	5.19 (0.98)	95%	112	-1.041 .298
Overall	*4.16 (1.47)*	*69%*	*245*	*4.90 (1.14)*	*89%*	*178*	***-5.199 < .001***	*4.94 (1.33)*	*89%*	*466*	*5.16 (1.06)*	*93%*	*282*	*-1.463 .143*
LTRS Rating Test Mann-Whitney U	**z = -2.268 exact *p* = .023 (2-tailed)**			**z = -2.856 exact *p* = .004 (2-tailed)**				z = -0.203 exact *p* = .839 (2-tailed)			z = -0.051 exact *p* = .960 (2-tailed)			
% Imp. Test Fisher's Ex.	**exact *p* = < .001 (2-sided)**			exact *p* = .197 (2-sided)				exact *p* = .454 (2-sided)			exact *p* = .628 (2-sided)			

These contradictory findings are similar to what was discovered in the review of previous research. In one of the two previous IGS studies found, Chen found no significant differences between master and doctoral students in the importance placed on LTRS (2007a; 2008). In the other study, Ruby, while not examining LTRS directly, did find significant differences between master and doctoral students in the importance placed on categories of choice factors (2007). She also noted differences based on degree level between students in the natural sciences and those in arts and social science fields.

The two-year difference may have been a contributing factor to the variation between the two samples. However, the findings may also suggest that international master and doctoral students in some disciplinary groups are more similar or dissimilar in their reliance on LTRS in selecting a HEI. This underlines the importance of considering both degree level and discipline in future work examining the role of LTRS in international graduate student choice.

7.3.2 Research Question 2b. Age

Rather than reducing the age variable from the interval to categorical level, in order to make bivariate comparisons between age groups, correlations were calculated between the age of respondents and the ordinal and dichotomous versions of the LTRS Rating variable. Since doctoral students are generally on average older than master students, the samples were further separated for this question based on degree level. Table 15 presents the results of the correlations calculated using Kendall's tau-b.

Table 15: Correlations between Age and Importance of Rankings

Age Correlations	2007 Survey (biology, chemistry, math, physics)				2009 Survey (economics, pol. science, psychology)			
	International Students from EU/EFTA Master (*n* = 58) Doctoral (*n* = 187)		International Students from other Nations Master (*n* = 50) Doctoral (*n* = 128)		International Students from EU/EFTA Master (*n* = 277) Doctoral (*n* = 188)		International Students from Other Nations Master (*n* = 170) Doctoral (*n* = 112)	
	Correlations with Age		Correlations with Age		Correlations with Age		Correlations with Age	
	LTRS Ordinal	LTRS Dicho.	LTRS Ordinal	LTRS Dicho.	LTRS Ordinal	LTRS Dicho.	LTRS Ordinal	LTRS Dicho.
Master	-.06	.00	.19	.12	-.03	-.08	-.01	.01
Doctoral	.00	-.05	.00	-.12	-.14*	-.14*	-.11	.01

Note: Correlations conducted with Kendall's tau-b using 2-tailed significance tests. * $p < .05$

Only one of the eight IGS groups showed a significant correlation between age and the importance placed on rankings. For doctoral students in the EU/EFTA IGS group from the 2009 sample, a weak negative correlation (-.14) was found between age and both the ordinal and dichotomous versions of the LTRS Rating variable ($p = .013$ and $p = .031$ respectively). This suggests that for the 2009 sub-sample of EU/EFTA IGS, as the age of students increased, the importance students placed on rankings decreased. However, the weakness of the correlation, and the fact that all other correlations were insignificant, suggests when degree level was considered, age likely played a minimal role for students in the samples.

As this is likely the first study to examine age as a potential contributing variable to the importance of LTRS specifically to IGS, there are few relevant previous studies with which to compare. In a domestic undergraduate student context, one study found that as the age of students increased, the likelihood they would rate rankings as important decreased (McDonough et al., 1998). This is similar to the weak negative correlation found in this thesis for the 2009 sample of international doctoral students from the EU/EFTA. However, since

domestic undergraduates are a different population than IGS, it is doubtful those results are directly comparable. Among graduate students, the two GMAC studies found no significant impact of age on the importance of rankings among a mixture of domestic and international graduate students (GMAC, 2008; GMAC, 2009). The GMAC studies did not present age differences between domestic and international students. Thus it is unclear if age played a role within those student groups in the study. Ruby also found no significant influence of age in the four categories of choice factors in her IGS study (2007).

The results of this project, and the few previous studies found, suggests age may not play a substantial role in the importance of rankings in international graduate student choice. However, those results are not yet conclusive. Consequently age should be examined in future research into the importance of LTRS in order to confirm or refute these findings.

7.3.3 Research Question 2c. Gender

Table 16 illustrates the results of the bivariate analysis conducted into the role of gender in the importance of rankings. For both the 2007 and 2009 samples, no significant differences were found based on gender using either of the two versions of the LTRS Rating variable. This was true for both the EU/EFTA and Other IGS groups. In the comparisons between those groups, both male and female Other IGS in the 2007 sample placed greater importance on rankings than their EU/EFTA counterparts. This is consistent with the overall difference between those two groups. In the 2009 sample the two groups did not differ significantly.

These overall results are consistent with the findings of the literature review. Most studies found gender did not play a role in the importance placed on LTRS (Chen, 2007a; 2008; GMAC, 2008; Heine et al., 2008; Mueller and Rockerbie, 2005; Pivo, 2005; Scott, 2006; Veloutsou, Lewis and Paton, 2004). Nonetheless, while those studies suggest gender may not play a role in diverse student groups, such as the overall samples in this thesis, findings from other studies suggests gender may have an impact when examining more specific student populations (Briggs and Wilson, 2007; Montgomery, 2002; Oosterbeek, Groot and Hartog, 1992; Soo and Elliott, 2008). As a result, gender was also investigated in relation to the respondent's discipline, degree level, and UNESCO region of origin. In the latter two cases no significant differences were found. However, looking at discipline, two significant differences were noted. Female biology IGS placed more importance on rankings than males ($p = .010$). Male chemistry IGS also placed more importance on rankings than females ($p = .012$).

Table 16: Demographic Comparisons of the Importance of Rankings: Gender

Gender	**2007 Survey (biology, chemistry, math, physics)**							**2009 Survey (economics, pol. science, psychology)**						
	International Students from EU/EFTA (*n* = 245)			**International Students from other Nations (*n* = 178)**			**EU/EFTA vs. Other**	**International Students from EU/EFTA (*n* = 466)**			**International Students from Other Nations (*n* = 282)**			**EU/EFTA vs. Other**
	LTRS Rating			**LTRS Rating**			**α < .025**	**LTRS Rating**			**LTRS Rating**			**α < .025**
	Mean (SD)	**% Imp.**	***n***	**Mean (SD)**	**% Imp.**	***n***	**Z_{M-W} *p***	**Mean (SD)**	**% Imp.**	***n***	**Mean (SD)**	**% Imp.**	***n***	**Z_{M-W} *p***
Male	4.11 (1.49)	67%	141	4.90 (1.21)	88%	105	**-4.356 < .001**	4.99 (1.39)	88%	233	5.22 (1.01)	95%	133	-.714 .476
Female	4.24 (1.46)	71%	104	4.89 (1.04)	90%	73	**-2.879 .004**	4.90 (1.28)	89%	233	5.10 (1.10)	91%	149	-1.356 .175
Overall	*4.16 (1.47)*	*69%*	*245*	*4.90 (1.14)*	*89%*	*178*	***-5.199 < .001***	*4.94 (1.33)*	*89%*	*466*	*5.16 (1.06)*	*93%*	*282*	*-1.463 .143*
LTRS Rating Test Mann-Whitney U	z = -0.692 exact *p* = .490 (2-tailed)			z = -0.526 exact *p* = .600 (2-tailed)				z = -1.505 exact *p* = .133 (2-tailed)			z = -0.777 exact *p* = .438 (2-tailed)			
% Imp. Test Fisher's Ex.	exact *p* = .488 (2-sided)			exact *p* = .635 (2-sided)				exact *p* = .771 (2-sided)			exact *p* = .234 (2-sided)			

The findings from this thesis suggest that overall gender did not play a substantial role in the importance students in the two samples placed on rankings. However, gender may play a role within certain disciplines. This underlines that the importance of rankings in IGS decision-making is often influenced by the interaction between multiple demographic traits.

7.3.4 Research Question 2d. Academic Discipline

Table 17 presents the analysis conducted among the different disciplinary groups in the two samples. In the 2007 sample, the KW and FE tests showed no significant differences among the EU/EFTA and Other IGS groups. Generally the lack of a significant difference for a group overall would preclude the use of post hoc sub-group comparisons. However, since this is an exploratory research project, the decision was made to conduct one MW test between the disciplines placing the highest and lowest levels of importance on rankings in the 2007 sample. Those tests showed that both EU/EFTA and Other IGS studying chemistry placed more importance on rankings than those studying physics ($p = .039$ and $p = .028$ respectively: Bonferroni corrected alpha level of $\alpha < .05$). In comparisons between the EU/EFTA and Other IGS groups, both biology and chemistry students in the latter group placed more importance on rankings than their EU/EFTA IGS counterparts ($p < .001$ and $p = .002$ respectively).

In the 2009 sample, no significant disciplinary differences were found among the Other IGS group, or between that group and EU/EFTA IGS. In contrast, the KW test of the ordinal version of the LTRS rating variable showed that the three EU/EFTA IGS disciplinary groups did vary significantly in the importance placed on rankings ($p < .001$). The FE test of the dichotomous version of the variable was technically not significant at $p = .051$. However, considering the test was just barely insignificant, and the ordinal test was clearly significant, it is likely that discipline did play a role in the EU/EFTA IGS students in the 2009 sample. In the subsequent MW tests among the groups in that sample, it was found that the EU/EFTA IGS studying economics programs placed significantly more importance on rankings than their political science of psychology counterparts ($p = .009$ and $p < .001$ respectively).

Table 17: Demographic Comparisons of the Importance of Rankings: Discipline

Discipline	2007 Survey							Discipline	2009 Survey						
	International Students from EU/EFTA (n = 245)			**International Students from other Nations (n = 178)**			**EU/EFTA vs. Other**		**International Students from EU/EFTA (n = 465)**			**International Students from other Nations (n = 280)**			**EU/EFTA vs. Other**
	LTRS Rating			**LTRS Rating**			**α<.013**		**LTRS Rating**			**LTRS Rating**			**α<.017**
	Mean (SD)	**% Imp.**	***n***	**Mean (SD)**	**% Imp.**	***n***	**Z_{M-W} *p***		**Mean (SD)**	**% Imp.**	***n***	**Mean (SD)**	**% Imp.**	***n***	**Z_{M-W} *p***
Biology	4.04 (1.51)	66%	82	4.99 (1.09)	89%	68	**-3.999 < .001**	**Economics**	5.15 (1.26)	92%	230	5.23 (0.97)	95%	158	-.347 .729
Chemistry	4.40 (1.41)	74%	102	5.11 (0.96)	93%	57	**-3.031 .002**	**Political Science**	4.79 (1.43)	84%	140	5.28 (.090)	93%	61	-1.934 .053
Math	4.00 (1.76)	58%	12	4.78 (1.20)	89%	9	-.885 .382	**Psychology**	4.67 (1.30)	87%	95	4.87 (1.30)	90%	61	-1.133 .258
Physics	3.92 (1.44)	65%	49	4.52 (1.34)	82%	44	-2.009 .044								
Overall	*4.16 (1.47)*	*69%*	*245*	*4.90 (1.14)*	*89%*	*178*	***-5.199 < .001***	***Overall***	*4.94 (1.33)*	*89%*	*466*	*5.16 (1.06)*	*93%*	*282*	*-1.463 .143*
LTRS Rating Test K-W	X^2_{K-W} = 5.044 df = 3 p = .169 (Monte Carlo)			X^2_{K-W} = 5.687 df = 3 p = .127 (Monte Carlo)				**LTRS Rating Test K-W**	**X^2_{K-W} = 16.823 df = 2 p = < .001 (Monte Carlo)**			X^2_{K-W} = 3.867 df = 2 p = .144 (Monte Carlo)			
% I. Test Fisher's E.	exact p = .489 (2-sided)			exact p = .328 (2-sided)				**% I. Test Fisher's E.**	exact p = .051 (2-sided)			exact p = .381 (2-sided)			

The results of this analysis suggest discipline may play some role in the importance of LTRS in IGS choice. Unfortunately, there is no way to know what impact the two-year difference between the two surveys may have had. Consequently, while disciplines in the 2009 sample rated rankings as more important than those in 2007, it is unknown if this is the result of disciplinary differences, or simply an increasing value of LTRS to IGS overall. The findings

here are consistent with previous research in a variety of domestic, international, and undergraduate contexts, which have shown that students in different disciplines, even closely related ones, such as in the natural or social sciences, often rate the value of LTRS in their decision-making process differently (Briggs and Wilson, 2007; Chen, 2007a; 2008; Hachmeister and Hennings, 2007; Heine et al., 2008; HERI, 2007; Pivo, 2005; Ruby, 2007; Soo and Elliott, 2008). The results of this thesis and those studies underscore the importance of considering discipline when investigating the role of rankings in IGS decision-making.

7.3.5 Research Question 2e. Country of Study

Table 18 presents the analysis conducted based on the country of study for the IGS in the two samples. In order to secure sufficient sample sizes for the comparisons, and to ensure the anonymity of the HEIs involved in the two surveys, only countries with at least three HEIs and 15 student responses from both the EU/EFTA and Other IGS groups were included in this analysis. This sub-sample represents 49% of the IGS and 55% of the HEIs in the 2007 sample, and 60% of the IGS and 59% of the HEIs in the 2009 sample.

Table 18: Demographic Comparisons of the Importance of Rankings: Country of Study

Country of Study	**2007 Survey (biology, chemistry, math, physics)**							**2009 Survey (economics, pol. science, psychology)**						
	International Students from EU/EFTA (*n* = 110)			**International Students from other Nations (*n* = 97)**			**EU/EFTA vs. Other**	**International Students from EU/EFTA (*n* = 304)**			**International Students from Other Nations (*n* = 201)**			**EU/EFTA vs. Other**
	LTRS Rating			**LTRS Rating**			**α < .017**	**LTRS Rating**			**LTRS Rating**			**α < .010**
	Mean (SD)	**% Imp.**	***n***	**Mean (SD)**	**% Imp.**	***n***	**Z_{M-W} *p***	**Mean (SD)**	**% Imp.**	***n***	**Mean (SD)**	**% Imp.**	***n***	**Z_{M-W} *p***
Germany (10/16 HEIs)	3.66 (1.57)	55%	29	4.61 (0.93)	89%	36	**-3.289 .001**	4.56 (1.55)	81%	27	5.07 (0.96)	96%	27	-.999 .322
Ireland (-/3 HEIs)								4.73 (1.87)	80%	15	5.47 (0.64)	100%	15	-.549 .610
Netherlands (3/8 HEIs)	3.98 (1.50)	64%	44	4.79 (1.22)	79%	39	**-3.289 .001**	5.01 (1.30)	90%	178	5.00 (1.21)	91%	68	-.388 .699
Spain (-/3 HEIs)								5.11 (1.13)	89%	18	4.70 (1.34)	80%	30	-1.088 .287
UK (3/11 HEIs)	4.84 (0.93)	89%	37	5.27 (1.08)	95%	22	**-4.130 < .001**	5.47 (0.77)	98%	66	5.49 (0.83)	98%	61	-.485 .631
Overall	*4.16 (1.47)*	*69%*	*245*	*4.90 (1.14)*	*89%*	*178*	***-5.199 < .001***	*4.94 (1.33)*	*89%*	*466*	*5.16 (1.06)*	*93%*	*282*	*-1.463 .143*
LTRS Rating Test Kruskal Wallis H	**X^2_{K-W} = 11.386 df = 2 p = .003 (Monte Carlo)**			**X^2_{K-W} = 6.714 df = 2 p = .034 (Monte Carlo)**				X^2_{K-W} = 9.303 df = 4 p = .052 (Monte Carlo)			**X^2_{K-W} = 13.761 df = 4 p = .007 (Monte Carlo)**			
% Imp. Test Fisher's Ex.	**exact *p* = .004 (2-sided)**			exact *p* = .217 (2-sided)				**exact *p* = .016 (2-sided)**			**exact *p* = .022 (2-sided)**			

For the 2007 groups, KW tests using the ordinal version of the LTRS Rating variable showed the sub-samples of the EU/EFTA and Other IGS groups varied significantly in the importance placed on rankings. The FE tests using the dichotomous version of the variable, however, were mixed. The EU/EFTA IGS remained significantly different, while the Other IGS group was no longer so. This suggests some potential cultural bias in the use of the rating scale for that group. MW comparisons between the countries of study showed that both the EU/EFTA and Other IGS groups studying in the UK placed greater importance on rankings than students in Germany ($p = .001$ and $p = .007$ respectively: Bonferroni corrected alpha level of $\alpha < .017$). EU/EFTA students in the UK also placed significantly more importance on ranking than their counterparts in the Netherlands ($p = .008$). In addition, in all three countries, Other IGS rated rankings higher than EU/EFTA IGS in the same countries.

For the 2009 sample, the FE tests showed significant variation among both the EU/EFTA and Other IGS groups. While the KW test was also significant for the Other IGS group, it was just over this project's alpha level for the EU/EFTA group ($p = .052$). Rather then conducting MW tests between all possible groups, in order to maintain a reasonable adjusted alpha level, comparisons were only made the two countries of study with the highest mean importance of rankings and the three with the lowest mean values. This resulted in six comparisons and a Bonferroni corrected alpha level of $\alpha < .008$. Those tests showed that the EU/EFTA IGS group studying in the UK rated rankings as more important than similar students in Germany ($p = .002$). Other IGS studying in the UK placed significantly more importance on rankings than the same group in the Netherlands and Spain ($p = .008$ and $p = .001$ respectively).

Some previous studies were identified which found significant regional differences in the importance of rankings within single countries (Heine et al., 2008; LHI, 2006; Li and Bray, 2007; Purcell et al., 2008). However, no previous work was found that used the same instrument to examine the role of LTRS to groups of students in different countries. Thus the results from the analysis for this research question represent an important contribution to the study of LTRS. Those results clearly show that the IGS in the two samples studying in different countries varied significantly in the importance of rankings in their decision-making.

7.3.6 Research Question 2f. Country/Region of Origin

This section uses three different approaches to analyzing the importance of respondent's country of origin. The first approach placed respondents into regional groups based on the classification from the 2009 UNESCO-UIS Global Education Digest (UNESCO-UIS, 2009).

The second approach looks at the specific nationality for countries with at least ten respondents. The final approach grouped respondents based on their country's Gross National Income per capita from the World Bank. Since these approaches are geographically based, the separation between EU/EFTA and Other IGS groups was not used in these analyses.

Table 19 summarizes the analysis of variations in the importance placed on rankings by students from the different UNESCO regions. For the 2007 sample, tests of both the ordinal and dichotomous version of the LTRS Rating variable showed significant regional differences. The 2009 sample did not show a significant overall regional difference.

Table 19: Demographic Comparisons of the Importance of Rankings: UNESCO Region of Origin

Nationality by UNESCO Region	**2007 Survey (biology, chemistry, math, physics**				**2009 Survey (economics, political science, psychology)**			
	All International Students (*n* = 423)				**All International Students (*n* = 748)**			
	LTRS Rating				**LTRS Rating**			
	Mean	**SD**	**% Imp.**	***n***	**Mean**	**SD**	**% Imp.**	***n***
Arab States	5.50	1.00	100%	4	5.33	1.16	92%	12
Central and Eastern Europe	4.72	1.13	86%	65	5.13	1.04	93%	149
East Asia and the Pacific	5.06	0.97	95%	64	5.36	0.97	96%	75
Latin America and Caribbean	4.22	1.58	67%	27	4.96	1.13	91%	56
North America	4.30	1.16	80%	10	4.89	1.31	86%	37
Western Europe	4.09	1.49	66%	214	4.89	1.39	88%	371
Central, South and West Asia	5.22	0.94	94%	32	5.14	1.06	93%	29
Sub-Saharan Africa	5.71	0.49	100%	7	5.42	0.61	100%	19
Overall	*4.47*	*1.39*	*77%*	*423*	*5.02*	*1.24*	*91%*	*748*
LTRS Rating Test Kruskal Wallis H	**$X^2_{K\text{-}W}$ = 47.608 df = 7 Monte Carlo sig. < .001**				$X^2_{K\text{-}W}$ = 10.916 df = 7 Monte Carlo sig. = .141			
% Imp. Test Fisher's Ex.	**exact *p* < .001 (2-sided)**				exact *p* = .195 (2-sided)			

Western European IGS were the largest group in both samples and placed the lowest level of importance on rankings. Consequently, that group was chosen as the comparison group for the MW tests. This resulted in seven comparisons and a Bonferroni corrected alpha level of $\alpha < .007$ for the 2007 sample. Students from four regions placed significantly higher importance on rankings than Western European IGS: Central and Eastern Europe ($p = .003$), East Asia and the Pacific ($p < .001$), Central, South and West Asia ($p < .001$), and Sub-Saharan Africa ($p = .001$). While the overall variation between regions was not significant in the 2009 sample, in light of the exploratory nature of this project, one MW test was conducted between

Western European IGS and those from East Asia and the Pacific. The latter group placed the highest level of importance on rankings in the sample, and has often been identified in previous research as being among the groups that rate rankings as most important (HERI, 2007; 2008; LHI, 2006; McDonough et al., 1998; Purcell et al., 2008; Rawson, 2004; UCAS, 2008). That comparison showed IGS from East Asia and the Pacific did rate rankings as significantly more important than Western European IGS in the 2009 sample ($p < .009$).

In addition to looking at regional groups of IGS, analysis was also conducted based on the specific nationality of students (Table 20). For each of the samples, any nationality with at least ten students was used in this analysis. Combined these nationalities represented 64% and 65% of the IGS in the 2007 and 2009 samples respectively. For the 2007 sub-sample, the included nationalities varied significantly in the value placed on rankings. However, the nationalities represented in the 2009 sub-sample were not significantly different. Unfortunately the large number of groups in this analysis made calculation of the FE Tests beyond the capabilities of a standard personal computer. In addition, the small sample sizes made the use of Chi Square test inappropriate. Consequently, no tests were made using the dichotomous version of the LTRS Rating variable for this research sub-question.

Rather than making all possible comparisons between nationalities, comparisons were made between the four nationalities with the highest mean scores and the three with the lowest mean scores for each year's sample. This resulted in twelve comparisons and a Bonferroni corrected alpha level of $\alpha < .004$. In the 2007 sample, Indian students placed significantly higher importance on rankings than those from Germany, France and Austria (all $p < .001$). Chinese students rated rankings as significantly more important than students from Germany and France (both $p < .001$). Rankings were also significantly more important for Italian than Germany students ($p = .003$). For the 2009 sample, no significant differences were found between the groups with the highest and lowest mean scores for the importance of rankings.

The results of the analysis based on the regional and nationality sub-samples are clearly contradictory for the two samples. While strong differences were found in the importance placed on rankings in the 2007 sample, the only significant difference found in the 2009 sample was between IGS from East Asia and the Pacific and those from Western Europe. The regional and national differences found in the 2007 sample are consistent with the previous studies which found differences based on nationality and/or ethnicity in student decision-making among both undergraduate and graduate student populations (ACA, 2005; Cantwell,

Table 20: Demographic Comparisons of the Importance of Rankings: Nationality

Nationality	2007 Survey (biology, chemistry, math, physics)			
	All International Students (*n* = 269)			
	LTRS Rating			
	Mean	SD	% Imp.	*n*
Indian	5.23	0.87	95%	22
Chinese	4.90	1.06	92%	40
Polish	4.88	1.03	88%	16
Italian	4.83	1.20	88%	24
Russian	4.75	1.00	88%	16
Greek	4.70	1.19	83%	23
Spanish	4.08	1.50	69%	13
German	3.81	1.58	60%	83
French	3.78	1.17	50%	18
Austrian	3.64	1.60	57%	14
Overall	*4.47*	*1.39*	*77%*	*423*
LTRS Rating Test Kruskal Wallis H	**$X^2_{K\text{-}W}$ = 39.332 df = 9 p = < .001 (Monte Carlo)**			
% Imp. Test Fisher's Ex.	Calculations too intensive for standard computer			

Nationality	2009 Survey (economics, political science, psychology)			
	All International Students (*n* = 488)			
	LTRS Rating			
	Mean	SD	% Imp.	*n*
Bulgarian	5.64	0.63	100%	14
Chinese	5.53	0.65	100%	38
Greek	5.47	0.80	100%	17
Austrian	5.42	0.79	100%	12
Brazilian	5.30	1.25	90%	10
Turkish	5.19	0.87	100%	21
Romanian	5.11	0.97	96%	27
Portuguese	5.08	0.90	100%	12
Belgian	5.06	0.97	100%	17
German	4.99	1.37	88%	171
American	4.96	1.26	86%	28
Italian	4.96	1.30	92%	24
Slovakian	4.83	0.58	100%	12
Dutch	4.70	1.30	85%	20
Spanish	4.69	1.97	77%	13
Columbian	4.67	1.07	83%	12
British	4.64	1.55	86%	14
Polish	4.25	1.82	58%	12
Overall	*5.02*	*1.24*	*91%*	*748*
LTRS Rating Test Kruskal Wallis H	$X^2_{K\text{-}W}$ = 23.741 df = 18 p = .159 (Monte Carlo)			
% Imp. Test Fisher's Ex.	Calculations too intensive for standard computer			

Luca and Lee, 2009; Chen, 2007a; Dawes and Brown, 2002; GMAC, 2008; HERI, 2007; 2008; Lee, 2008; LHI, 2006; McDonough et al., 1998; Montgomery, 2002; Pivo, 2005; Poock and Love, 2001; Purcell et al., 2008; Quacquarelli and Geraghty, 2008; Rawson, 2004; Ruby, 2007; Shah and Laino, 2006; Shanka, Quintal and Taylor, 2005; Teranishi et al., 2004; UCAS, 2008). The results of both the 2007 and 2009 samples showing that students in the sample from the East Asian and the Pacific region, were also consistent with previous research which has often shown that students with nationalities or ancestry from East Asia often rate rankings as more important to their decision-making (HERI, 2007; 2008; LHI, 2006; McDonough et al., 1998; Purcell et al., 2008; Rawson, 2004; UCAS, 2008). However, it is unclear why so few differences were found in the 2009 sample compared to 2007. It may

be the result of sampling error, the different disciplines included in the two samples, or the two-year time difference between surveys. Thus further research is needed to clarify the role region and country of origin play in the importance of rankings in IGS choice.

In addition to examining the role of a student's geographic region of origin, the IGS in the study were also grouped by the annual Gross National Income per capita as defined by the World Bank. While countries in some regions, such as North America and Western Europe, are all within the high income group, other regions are more heterogeneous. As a result, comparing respondents based on the income level of their home country provides an alternative to investigate potential differences in the importance of rankings among IGS.

Table 21 shows that the four income groups differed significantly in the importance placed on rankings in both the 2007 and 2009 samples. This was the case using both the ordinal and dichotomous versions of the LTRS Rating variable. The table also demonstrates that the mean scores, as well as the percentage of respondents in each group stating rankings were important, decreased when moving to the next highest income group. Since the income groups can be seen as ranked, the variable can be treated as ordinal. Thus, rather than conducting MW tests between the groups, Kendall's tau-b correlations were calculated between income and both the ordinal and dichotomous versions of the LTRS Rating variable. For the 2007 sample, this showed a moderate negative correlation between income and both variables (correlation coefficient = - .23, $p < .001$ for both variables). While the correlations in the 2009 sample were weaker, both were still significant negative correlations (ordinal LTRS Rating correlation coefficient = -. 09, $p = .006$; dichotomous LTRS Rating correlation coefficient = -. 10, $p = .004$). These results show that the level of income of the respondent's home country was a contributing factor to the importance respondents placed on rankings.

No previous studies which used an income-based approach to study the role of rankings among different international students groups were found. However, the findings presented above can be related to push-pull theory as discussed in Chapter 4. In both samples, the vast majority of students in the higher income group came from the EU/EFTA region (89% and 87% respectively). In addition, a further 2% and 6% came from the US. Thus the push pull analysis of those regions by Wit, and Wit and Rumbley, provide some guidance for understanding these results (Wit, 2008b; Wit and Rumbley, 2008). From an outbound

mobility perspective, Wit's analysis of the EURODATA[26] region showed rankings as a minimally significant[27] push factor for students from the region. Similarly, Wit and Rumbley's analysis of the US noted rankings as an insignificant factor in outbound mobility. This is consistent with the relatively lower level of importance students from the higher income countries in the two samples placed on rankings. From the perspective of inbound mobility into the EURODATA region, Wit noted rankings were a significant pull factor. This is also consistent with the results of this thesis, which showed students coming from outside the region (i.e. the low and middle income groups) placed greater importance on rankings in their decision-making than the higher income groups (i.e. mostly EU/EFTA and US students).

Table 21: Demographic Comparisons of the Importance of Rankings: National Income Group

Nationality by World Bank National Income Level (2008) (in US Dollars)	**2007 Survey (biology, chemistry, math, physics**				**2009 Survey (economics, political science, psychology)**			
	All International Students (*n* = 423)				**All International Students (*n* = 748)**			
	LTRS Rating				**LTRS Rating**			
	Mean	**SD**	**% Imp.**	***n***	**Mean**	**SD**	**% Imp.**	***n***
Low ($975 or less)	5.67	0.50	100%	9	5.35	0.80	97%	31
Lower middle ($976 - $3,855)	4.98	1.03	91%	92	5.33	0.85	97%	109
Upper middle ($3,856 - $11,905)	4.73	1.29	84%	77	5.08	1.15	91%	143
High ($11,906 or more)	4.16	1.46	69%	245	4.91	1.35	88%	465
Overall	*4.47*	*1.39*	*77%*	*423*	*5.02*	*1.24*	*91%*	*748*
LTRS Rating Test Kruskal Wallis H	**$X^2_{K\text{-}W}$ = 33.668 df = 3 Monte Carlo *p*. < .001**				**$X^2_{K\text{-}W}$ = 8.123 df = 3 Monte Carlo *p*. = .043**			
% Imp. Test Fisher's Ex.	**exact *p* < .001 (2-sided)**				**exact *p* = .014 (2-sided)**			

7.4 Binary Logistic Regression Analysis

The bivariate analyses presented in the previous section provide an understanding of the role specific demographic variables played in the importance the sub-samples placed on rankings. However, bivariate analysis does not account for the possible influence of other variables (Bryman, 2008). While multiple regression techniques are often used in multivariate analysis, those techniques require interval level data for the dependent variable (Levin, Fox and Forde, 2010). When working with ordinal or dichotomous variables, such as the two versions of the LTRS Rating variable used in this thesis, logistic regression is the primary multivariate

[26] Includes the 31 countries in the EU/EFTA as well as Turkey.
[27] Note significance here refers to importance rather than the statistical use of the word.

analysis option (Agresti, 2002). Logistic regression techniques also have an advantage in that they allow the inclusion of categorical and continuous independent variables (Wright, 1997).

Logistic regression techniques generally require large sample sizes in order to be effective (Hosmer and Lemeshow, 2000). One problem with smaller sample sizes is they often result in empty cells in the regression's underlying contingency tables. This can result in instability in the logistic regression model and bias in the calculated odds ratios (Agresti, 2002). Since this project only has a moderate sample size, and considering the high level of importance most respondents in most groups placed on rankings, the use of ordinal logistic regression would result in a large number of empty cells. Consequently, since the dichotomous version of the LTRS Rating variable yielded similar results as the ordinal version in most cases during the bivariate analysis, the decision was made to use binary logistic regression analysis. Combining the three important and not important options into a dichotomous variable greatly reduced the number of empty cells. This helped reduce the need to eliminate or combine categories among the independent variables in order to calculate the regression model.

Hosmer and Lemeshow suggest that any independent variable which showed a probability value of < .25, in relation to variation in the dependent variable, should be considered for a logistic regression model (2000). As the Fisher's Exact test results were below this level for at least one IGS group in each of demographic analyses presented in the last section, each demographic variable was included in the regression model. This choice was also made since the inclusion of more variables can also be useful in exploratory research to help ascertain possible relationships to suggest future research directions (Agresti, 2002). However, it is also important to maintain a sufficient balance between the number of cases and the number of independent variables included. One commonly used suggestion is that there should be no more than one independent variable for every ten outcomes of the dependent variable (Peduzzi et al., 1996). In the case of this thesis, the numbers of IGS reporting rankings had some level of unimportance were 99 and 72 in the 2007 and 2009 samples respectively. Thus, the six variables being included in the model fall within those guidelines.

Some slight modifications to the variables and dataset were necessary in order to calculate the regression model. The first involved centering the age variable by subtracting 27 (the rounded mean age for all IGS in both samples) from each respondent's stated age. This centering of the interval level independent variable is useful since that variable is included in an interaction which is subsequently discussed (Agresti, 2002).

While the decision to use the dichotomous version of the LTRS Rating variable nearly eliminated the zero cell problem, two UNESCO regional groups in the 2007 sample (Arab States and Sub-Saharan Africa) and one in the 2009 sample (Sub-Saharan Africa) had 100% of their respondents place some level of importance on rankings. This would result in a zero cell for those groups in relation to the unimportant value of the dichotomous LTRS Rating variable. In turn some calculations in the regression would then be forced to divide by zero, which would clearly yield unsatisfactory results. The primary ways researchers often cope with this zero cell problem are to combine categories or to add a constant to every cell in the regression's contingency table. However, the latter suggestion is not considered an adequate solution and can be problematic with large numbers of cells (Agresti, 2002; Hosmer and Lemeshow, 2000). Also combining the regions with zero cells with other regions would not properly reflect their geographic distribution. Consequently, a compromise decision was made. Respondents from the Arab States and Sub-Saharan Africa who selected "I don't know" or "N/A" for the rankings factor were recoded to reflect a not important choice. It is arguable that the selection of those options in fact implies some level of unimportance of rankings to the respondent. In addition, this change only represented four cases (0.3% of the two samples). Thus the overall impact is relatively minor compared to changing all group values in the dataset, such as through addition of a constant to all cells.

7.4.1 Associations between variables included in this project

Logistic regression models can suffer when there is substantial collinearity between the independent variables included in the model (Menard, 2002). This collinearity can result in increased standard errors and reduced estimate effects in the regression (Agresti, 2002). Creating a correlation matrix can be useful to identify relationships between independent variables (Leech, Barrett and Morgan, 2005). However, as most of the independent variables in this project are categorical, traditional Pearson's correlation coefficients are inappropriate, since they require interval level data. Instead an association matrix was created for each sample based on the use of Cramer's *V*, which can be used with categorical data, and returns a value roughly analogous to Pearson correlations (Cramer and Howitt, 2004).

Table 22 and Table 23 show the association matrices among variables for the 2007 and 2009 IGS samples respectively. All independent variables used in the bivariate analysis are listed in the matrices. The ordinal and dichotomous versions of LTRS Rating variable are also included to provide a summary of relationships between dependent and independent variables.

Table 22: Associations between Independent and Dependent Variables - 2007 Survey (biology, chemistry, math, and physics)

Association Matrix	2007 Survey (biology, chemistry, math, physics)									
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1. Rankings Importance 6-point scale	1.00									
2. Rankings % any level of importance	1.00	1.00								
3. Age in Years[1]	-.05	**-.13****	1.00							
4. Gender	.08	.04	.25	1.00						
5. Degree Level	**.22****	**.19*****	**.54*****	.06	1.00					
6. Discipline	.10	.08	.21	**.19****	**.21*****	1.00				
7. Country of Study	**.12*****	**.16***	**.24***	.12	**.33*****	**.35*****	1.00			
8. UNESCO Region of Origin	**.17*****	**.29*****	**.32***	.12	.13	**.16***	**.19*****	1.00		
9. World Bank Income Level	**.17****	**.23*****	**.32****	.11	.08	**.13****	**.18*****	**.78*****	1.00	
10. EU/EFTA or Other IGS	**.27*****	**.22*****	.23	.03	.04	.12	**.24*****	**.91*****	**.77*****	1.00

* $p < .05$, ** $p < .01$, *** $p < .001$

1. Comparisons between age and the two rankings variables are Kendall's tau-b correlations. All other cells represent Cramer's *V* associations.

Table 23: Associations between Independent and Dependent Variables - 2009 Survey (economics, political science, and psychology)

Association Matrix	2009 Survey (economics, political science, psychology)									
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1. Rankings Importance 6-point scale	1.00									
2. Rankings % any level of importance	1.00	1.00								
3. Age in Years[1]	-.05	-.06	1.00							
4. Gender	.10	.02	**.24****	1.00						
5. Degree Level	.08	.02	**.55*****	.06	1.00					
6. Discipline	**.13****	**.09***	**.26*****	**.26*****	**.24*****	1.00				
7. Country of Study	**.15*****	.15	**.22*****	.14	**.46*****	**.48*****	1.00			
8. UNESCO Region of Origin	**.09*****	.11	**.23***	.09	.17	**.21*****	**.26*****	1.00		
9. World Bank Income Level	.09	**.11***	.19	.05	.06	**.17*****	**.23*****	**.73*****	1.00	
10. EU/EFTA or Other IGS	.11	.07	.21	.02	.01	**.09***	**.32*****	**.89*****	**.70*****	1.00

* $p < .05$, ** $p < .01$, *** $p < .001$

1. Comparisons between age and the two rankings variables are Kendall's tau-b correlations. All other cells represent Cramer's *V* associations.

One recommended guideline for reducing collinearly in logistic regression is to eliminate or combine independent variables which have a correlation greater than .70 (Leech, Barrett and Morgan, 2005). The associations in the two samples above that level were all between the UNESCO region, World Bank income level, and EU/EFTA or Other IGS variables (all $V >$ .70). This is as expected since these variables are very much related. As an example, most EU/EFTA IGS were from Western Europe, which is made up exclusively of countries in the high income World Bank grouping. Therefore, including all three variables in the regression

model would result in substantial overlap. Therefore, only one of variables was included in the regression model at a time. This section presents the regression results using the region-based variable. Since the regression models using the income and EU/EFTA status variables had largely the same findings, rather than presenting the full results of those regressions in a table, the different findings using income and EU/EFTA status are discussed in the narrative.

In the 2007 and 2009 samples, the associations between the age and degree level variables were $V = .54$ and $V = .55$ respectively. These levels do not exceed the .70 collinearity guideline. However, there is a clear logical relationship between those two variables, since doctoral students in the samples, and in general, are on average older than master-level students. As a result, there may have been problems in including both variables in the regression models. Nevertheless, both variables are of interest since bivariate analyses showed variation in the importance of rankings between degree levels in the 2007 sample and a correlation between the importance of rankings and the age of EU/EFTA doctoral students in the 2009 sample. Hosmer and Lemeshow recommend including an interaction in a regression model if there are logical as well as statistical grounds for doing so (2000). Consequently, since doctoral students are in general older than master-level students, and the association between age and degree level approached collinearity guidelines, an interaction between the variables was added to the regression model to help control for their relationship. County of Study had association with degree level and discipline near .50 in the 2009 sample. However, since there is not a clear logical reason why those variables are fairly highly associated, no interaction was included for those variables in the regression models.

7.4.2 Binary Logistic Regression Analysis Results

Since the primary goal of this thesis is to explore potential variations in the importance placed on rankings among different graduate student populations, the complete results of the binary logistic regression analysis are not presented. This section focuses on presenting the odds ratios and their significance values in order to show the degree of difference between different sub-samples[28] in this study. More detailed regression results are located in Appendix E. In an exploratory project, Menard suggests comparing sub-groups within an independent variable, even when variation within that variable overall is not significant (2002). Consequently, the

[28] Readers may note that the sample sizes in the regression results vary from those in the bivariate analyses in the previous section. This is due to the fact that logistic regression relies on each case having valid values for all variables included in the regression. As an example, while a male respondent who answered the survey's rankings question would be included in gender-based bivariate analysis, he would not be included in regression calculations if he had a missing value for age or any other independent variable being used in the regression.

discussion in this section also includes commentary on significant relationships found between both significant and insignificant independent variables in the regression.

Table 24 presents results of the binary logistic regression analysis for the 2007 IGS sample. The table includes the percentage of respondents in each demographic category who placed some importance on rankings. In addition the odds ratio, significance value, and relative risk ratio are presented for each group in two conditions. The crude values represent the results of a regression only including one independent variable in the model. The adjusted values show the results after controlling for all other variables included in the regression model.

Table 24: Results of Binary Logistic Regression: 2007 Survey (biology, chemistry, math, and physics)

Independent Variable (Reference Group)		**Rankings**	**Crude**			**Adjusted/Estimated**		
	n	**% Imp.**	**OR**	***P***	**RR**	**OR_{adj}**	***p***	**RR_{est}**
Gender (Male)	247	75%						
Female	178	79%	1.21	.421	1.05	1.14	.640	1.03
Age in years	425	NA	**0.94**	**.038**	NA	0.96	.407	NA
Degree Level (Doctoral)	317	72%						
Master	108	91%	**3.83**	**< .001**	**1.26**	**8.08**	**< .001**	**1.33**
Age x Degree Interaction						1.13	.408	
Discipline (Math)	21	71%		.501			.391	
Biology	152	76%	1.24	.675	1.06	2.29	.182	1.19
Chemistry	159	81%	1.65	.337	1.13	2.24	.183	1.19
Physics	93	73%	1.09	.875	1.02	1.45	.545	1.10
Region (Western Europe)	214	66%		**< .001**			**< .001**	
Arab States	5	80%	2.03	.530	1.20	1.26	.845	1.07
Central and Eastern Europe	65	86%	**3.16**	**.003**	**1.30**	**4.56**	**< .001**	**1.36**
East Asia and the Pacific	64	95%	**10.31**	**< .001**	**1.44**	**11.66**	**< .001**	**1.44**
Latin America and Caribbean	27	67%	1.01	.974	1.00	1.33	.571	1.09
North America	10	80%	2.03	.379	1.20	2.51	.292	1.25
Central, South and West Asia	32	94%	**7.61**	**.006**	**1.41**	**10.26**	**.003**	**1.44**
Sub-Saharan Africa	8	88%	3.55	.240	1.32	6.91	.090	1.40
Country of Study (UK)	59	92%		.053			**.006**	
Germany	65	74%	**0.26**	**.014**	**0.81**	**0.20**	**.007**	**0.75**
Netherlands	84	70%	**0.22**	**.004**	**0.77**	**0.11**	**< .001**	**0.59**
Switzerland	152	74%	**0.27**	**.009**	**0.81**	**0.27**	**.018**	**0.81**
Other	65	80%	**0.37**	**.077**	**0.87**	**0.21**	**.018**	**0.76**
Constant						2.66	.207	
Other = Belgium (*n* = 3), Denmark (*n* = 12), Italy (*n* = 4), Norway (*n* = 8), Spain (*n* = 4), and Sweden (*n* = 34)								

An explanation of odds and relative risk ratios may help the reader to interpret the regression results presented. Odds and relative risk ratios are similar and often confused in the presentation and analysis of logistic regression results (King, 2008). When the outcome of the dependent variable being examined is very infrequent, the two ratios often have similar

values. However, when the condition (e.g. importance placed on rankings) is frequent, the two ratios have very different values (Osborne, 2008). An odds ratio is defined as the odds of an event occurring in one group divided by the odds of the event occurring in another group (King, 2008). The odds of an event (e.g. rating rankings as important) is simply the probability of the event occurring divided by the probability of it not occurring; odds = $p/(1-p)$. Thus the odds ratio for group 1 compared to group 2 would be calculated as $(p_1/(1-p_1)) / (p_2/(1-p_2))$. An odds ratio of greater than one indicates that the event is more likely to occur in group 1 than group 2. Conversely, an odds ratio of less than one indicates a lower likelihood of the event in group 1 compared to group 2. Odds ratios do not give any indication of the underlying probabilities on the variables being examined and different combinations of probabilities can yield the same odds ratios[29] (King, 2008). For this reason, the percentage of students who reported that rankings had some level of importance in their HEI choice are shown in order to put into context the relative effect of changes between the crude odds ratios, and the ratios after controlling for other variables in the regression

Using the region variable from Table 24 as an example, the odds of an IGS from Central and Eastern Europe (hereafter CEE) placing some level of importance on rankings were (.86/.14) or 6.14. In other words, for about every six CEE IGS who placed some level of importance on rankings, there was one CEE IGS student who did not. In comparison the odds for Western European IGS were (.66/.34) or 1.94. Thus the odds ratio of CEE IGS compared to Western European IGS is the odds of the previous group divided by the latter: 6.14/1.94 or 3.16. This is the same as the crude odds ratio presented in the table. In other words, CEE IGS in the 2007 sample were over 3 times as likely as Western European IGS to state rankings had some level of importance compared to those stating rankings had some level of unimportance.

Interpreting odds ratios is often counterintuitive and difficult, even for knowledgeable readers. Consequently, it is often suggested that, in addition to odds ratios, relative risk ratios are presented and used to describe research findings (Osborne, 2008). Relative risk ratios are the probability of an event occurring in one group (e.g. rating rankings as important) divided by the probability in another group; p_1/p_2. Using the example from Table 24 the relative risk ratio for CEE compared to Western European IGS is .86/.66 or 1.30. In other words, CEE IGS were 1.30 times as likely as Western European IGS to rate rankings as important.

[29] As an example a comparison between two groups with probabilities of an event occurring of 90% and 75% would yield approximately the same odds ratio as two groups with values of 70% and 44%.

Crude relative risk ratios for the impact of single independent variables can be calculated since the percentage of respondents rating rankings as important is known. However, logistic regression models including multiple independent variables only return odds ratios. These adjusted odds ratios are presented in the tables. In order to ease the understanding of changes in the importance of the independent variables as the result of controlling for other variables, estimated relative risk ratios are also included and are used in the discussion of this section's findings. These estimates were calculated using a commonly used formula for estimating relative risk ratios from odds ratios. The formula is $RR_{est} = OR/[(1 - P_0) + (P_0 * OR)]$, where P_0 is the probability of the event occurring in the reference group (Zhang and Yu, 1998). Using the same example, the odds ratio for CEE compared to Western European IGS in the 2007 sample is 4.56 after adjusting for the influence of other variables in the regression model. Thus the estimated relative risk ratio using Zhang and Yu's calculation is 4.56/[(1 - .66) + (.66 * 4.56)] or 1.36. In other words, by controlling for other independent variables in the regression model, CEE IGS were 36% more likely than Western European IGS to rate rankings as important to their choice of HEI. Hence compared to the 30% difference in the crude model, after controlling for the influence of other variables, the difference in the importance placed on rankings between IGS from Central and Eastern Europe compared to those from Western Europe in the 2007 sample became even more pronounced.

Examining the results presented in Table 24 it can be seen that gender and discipline were not significant predictors of the importance placed on rankings among IGS in the 2007 sample. This was the case in both the crude model and the full regression model incorporating all independent variables. Age had a significant impact on the importance placed on rankings when evaluated alone ($p = .038$). However, after including other factors, such as degree level, as well as the interaction between age and degree level, age was no longer a significant predictor of importance being placed on rankings. Degree level, on the other hand, did remain a significant predictor when controlling for other factors in the regression.

While just over this project's alpha level in the crude model ($p = .053$), country of study became significant when holding the other independent variables constant in the full regression model ($p = .006$). Since IGS studying in the UK most frequently rated rankings as important, that country was used as the reference group in the regression. Based on inverted[30]

[30] Odds and relative risk ratios can be inverted by dividing 1 by the ratio. As an example, the relative risk ratio of IGS studying in Germany compared to the UK was .75, indicating the previous groups was 25% less likely than the latter to rate rankings as important. If the preferred comparison is IGS in the UK compared to Germany, the

estimated relative risks ratios, IGS studying in the UK were significantly more likely to place some importance on rankings than all other groups in the 2007 sample: Switzerland (23%), Other Countries of Study (32%), Germany (33%), and the Netherlands (69%). Other than Switzerland, the crude odds ratios decreased substantially when all independent variables were entered into the model, suggesting that studying in the UK was an even stronger predictor when other potential influencing factors were controlled. Region was also a significant predictor of respondents rating rankings as important. IGS from three regions were significantly more likely to rate rankings as important than the Western European IGS reference group: East Asia and the Pacific (44%), Central, South, and West Asia (44%), and Central and Eastern Europe (36%).

Binary logistic regressions models were also calculated using all of the independent variables, but substituting the Income and EU/EFTA or Other IGS status variables for the Region variable. Since the results for the other independent variables were very similar to those presented in Table 24, for space considerations, the full results are not be presented. Instead only the relevant aspects of the substituted variables are discussed below.

In both the crude and full regression models using the Income and EU/EFTA or Other IGS variables, those two variables were significant predictors of importance being placed on rankings (both $p < .001$). In the full model incorporating all independent variables and Income, two income groups were found to have placed significantly greater importance on rankings than the High income group which was used as the reference: Lower Middle ($OR_{adj} = 6.47$, $p < .001$, $RR_{est} = 1.36$) and Upper Middle ($OR_{adj} = 3.13$, $p = .002$, $RR_{est} = 1.27$). The regression using the EU/EFTA or Other IGS variable and all other independent variables showed that the Other IGS groups were significantly more likely to rate rankings as important than the IGS from the EU/EFTA region ($OR_{adj} = 4.19$, $p < .001$, $RR_{est} = 1.31$).

Table 25 presents the binary logistic regression results for the 2009 sample. Similar to the bivariate analysis for the 2009 sample presented earlier in this chapter, the regression analysis found few significant differences in the importance placed on rankings among the various demographic groups. As in the 2007 sample, age was just significant when used alone in the crude model ($p = .050$), but again when included in the full regression model with the degree level variable and the Age/Degree Level interaction, it was no longer a significant predictor.

relative risk ratio can be converted as 1/.75 which equals 1.33. In other words, IGS studying in the UK were 33% more likely than IGS studying in Germany to rate rankings as important.

In the 2009 sample, degree level and gender were not significant. Discipline was significant in the crude model (p = .043). However, in the full regression model it was just over the alpha value set for this thesis (p = .051). Among the disciplines, IGS studying economics were 8% more likely to rate rankings as important than IGS studying political science (p = .027).

Table 25: Results of Binary Logistic Regression: 2009 Survey (economics, political science, and psychology)

Independent Variable (Reference Group)		**Rankings**	**Crude**			**Adjusted/Estimated**		
	n	**% Imp.**	**OR**	***p***	**RR**	**OR_{adj}**	***p***	**RR_{est}**
Gender (Male)	361	91%						
Female	379	90%	0.87	.588	0.99	0.87	.613	0.99
Age in years	740	NA	0.95	**.050**	NA	0.93	.131	NA
Degree Level (Doctoral)	296	90%						
Master	444	91%	1.13	.619	1.01	1.03	.936	1.00
Age x Degree Interaction						1.04	.544	
Discipline (Political Science)	199	87%		**.043**			.051	
Economics	386	93%	**1.99**	**.017**	**1.07**	**2.45**	**.027**	**1.08**
Psychology	155	89%	1.14	.691	1.02	1.32	.535	1.03
Region (Western Europe)	367	88%		.348			.438	
Arab States	12	92%	1.52	.693	1.04	0.84	.878	0.98
Central and Eastern Europe	146	93%	1.92	.073	1.06	**2.51**	**.038**	**1.08**
East Asia and the Pacific	74	96%	**3.31**	**.050**	**1.09**	2.59	.140	1.08
Latin America and Caribbean	56	91%	1.41	.489	1.04	2.03	.225	1.07
North America	37	86%	0.88	.807	0.98	1.21	.731	1.02
Central, South and West Asia	29	93%	1.86	.407	1.06	1.47	.628	1.04
Sub-Saharan Africa	19	95%	2.62	.353	1.08	1.60	.668	1.05
Country of Study (UK)	126	98%		.191			.085	
Belgium	24	92%	0.18	.091	0.93	0.15	.072	0.92
France	31	94%	0.23	.152	0.95	0.14	.068	0.91
Germany	54	89%	**0.13**	**.014**	**0.90**	**0.11**	**.009**	**0.88**
Hungary	25	88%	**0.12**	**.023**	**0.89**	**0.07**	**.013**	**0.83**
Italy	64	89%	**0.13**	**.013**	**0.91**	0.20	.061	0.94
Ireland	30	90%	**0.14**	**.039**	**0.91**	**0.15**	**.049**	**0.92**
Netherlands	245	90%	**0.15**	**.010**	**0.92**	**0.10**	**.003**	**0.88**
Spain	48	83%	**0.08**	**.002**	**0.85**	**0.06**	**.001**	**0.80**
Switzerland	22	82%	**0.07**	**.004**	**0.83**	**0.05**	**.001**	**0.76**
Other	71	85%	**0.09**	**.002**	**0.86**	**0.07**	**.001**	**0.82**
Constant						39.71	**< .001**	
Other = Austria (n = 10), Czech Republic (n = 10), Denmark (n = 10), Estonia (n = 1), Finland (n = 14), Norway (n = 5), Poland (n = 1), Portugal (n = 5), and Sweden (n = 15)								

When looking at the variables overall, Region and country of study were not significant. Nevertheless a few groups within those variables varied significantly in the value placed on rankings. Central and Eastern European IGS were 8% more likely than Western European IGS to rate rankings at some level of importance (p = .038). In addition, IGS studying in the UK were also significantly more likely to place some importance on rankings than several

other countries of study: Ireland (9%), Germany (14%), the Netherlands (14%), Hungary (20%), Other Countries of Study (22%), Spain (25%), and Switzerland (32%).

The regressions run using the Income and EU/EFTA or Other IGS variables were both not significant for those variables (p = .110 and p = .092 respectively). However, in the full regression model using the EU/EFTA or Other IGS variable, discipline become a significant predictor (p = .020). While Income was not significant, one group in the variable, Lower Middle, was significantly more likely than the High income group to place some importance on rankings Lower Middle (OR_{adj} = 4.290, p = .021, RR_{est} = 1.10).

7.5 Comparison Between Results of the Bivariate and Regression Analyses

In general the binary logistic regression analyses conducted showed similar results to the bivariate analyses from the previous section. As in the bivariate analysis there were more significant differences found among the international student groups in the 2007 sample compared to 2009. Groups based on degree level, UNESCO region, World Bank income level, country of study, and EU/EFTA or Other IGS status all showed significant variation in the bivariate analyses of the 2007 sample. Each of these factors remained significant when entered into the regression model to control for the influence of other independent variables.

For the 2009 sample, while country of study and Income groups varied significantly in the bivariate analyses, the groups were no longer significant in the regression models (p = .110 and p = .085 respectively). This suggests that other variables may have been at least partially responsible for their significance in the bivariate analysis. However, there were significant differences between specific groups within those categories, including 7 out of the 10 countries which had lower values for rankings than the UK. In addition, EU/EFTA or Other IGS status as well as discipline were both technically not significant in the 2009 regressions (p = .092 and p = .051 respectively). Discipline was significant in the regression model using EU/EFTA or Other status rather than UNESCO region (p = .020). While not significant, the probability values for country of study, UNESCO region, and Income did approach the alpha level set for this project, $\alpha < .05$. Considering the fact these demographic factors were clearly significant in the 2007 sample, it may be worthwhile to continue examining potential country and region specific demographic groups in future research into the influence of LTRS to student choice.

Chapter 8: Summary of Findings and Discussion

8.1 Summary of Findings to Research Question 1.

One of the main rationales which drove the choice of this thesis topic was to investigate if there was empirical evidence to support a common conception of many in higher education that LTRS are more important to international than domestic students in choosing a HEI (see Section 3.4). However, as was discussed in the Chapter 5, it was quickly discovered that very few empirical studies have actually taken place to confirm that conception. In addition, since no previous such studies were found in the thorough literature review undertaken for this project, this thesis likely represents the first project to examine potential differences in the importance of rankings between domestic and international graduate students (IGS).

The examination of differences between domestic and IGS in the 2007 and 2009 samples showed notable consistency in the mean scores of the importance placed on rankings. In both samples and at both degree levels, IGS from outside the EU/EFTA region gave the highest rating to rankings, followed by the EU/EFTA IGS, and lastly domestic graduate students. Table 26 presents a summary of the significance levels of those differences. Those results strongly suggest that IGS from outside the EU/EFTA placed significantly more importance on rankings in their choice than domestic graduate students. Likewise, EU/EFTA IGS rated rankings as more important that their domestic counterparts in the 2009 sample. While not conclusive, those findings do suggest that international graduate students may in fact rely more heavily on LTRS in their decision-making than domestic graduate students.

Table 26: Importance of Rankings Summary: International and Domestic Comparisons

	2007 Survey (biology, chemistry, math, physics)			**2009 Survey (economics, poli. science, psychology)**		
Degree	**A > C**	**B > C**	**B > A**	**A > C**	**B > C**	**B > A**
Master	ns	***	***	***	***	ns
Doctoral	ns	***	***	***	***	ns

* $p < .05$, ** $p < .01$, *** $p < .001$, ns = not significant at $\alpha < .05$

A: International Graduate Students from the EU/EFTA Region
B: International Graduate Students from other Nations
C: Domestic Graduate Students from the EU/EFTA Region

Although rankings were the primary choice factor of interest in this thesis, differences in the importance of other choice factors between domestic and IGS were also analyzed for this research question. The comparisons presented in the previous chapter showed that domestic

graduate students in the two samples varied significantly from at least one of the IGS groups in the importance placed on all factors included in the surveys, with the exception of "Attractive location of university." In comparison, there were few significant differences in the importance of the various factors between the EU/EFTA and Other IGS groups. This relative similarity among the two IGS groups, and their dissimilarity with the domestic graduate student group, suggests that the influential factors in the choice of a HEI may in fact be different for international and domestic graduate students.

Overall the results for this research question suggested that IGS in the two samples rated reputational and quality related factors, such as ranking, HEI reputation, and quality of research, as more important than domestic graduate students, who in turn placed more importance on location specific factors, such as distance of the HEI to their home town, having relatives/partner or friends at the HEI, and having a previous degree from the HEI.

The relative importance of rankings to the other factors in the surveys was also examined. That examination showed that LTRS were a middle-level choice factor for both IGS and domestic groups in the two samples. Comparisons of the importance of the various choice factors relative to other factors showed much less variation between the IGS groups and domestic students than the comparisons of the factors individually. As an example, in all but one of the twelve comparisons between domestic master-level students and the two international master student groups, the latter groups placed significantly more importance on these factors: HEI reputation, subject-specific reasons, and rankings. Yet when comparing the importance of those factors in relation to other choice factors, they were ranked 1-2-3 respectively for the domestic and both international master student groups in the 2007 and 2009 samples. This finding suggests that while there may be significant variation between domestic and IGS in the importance placed on individual choice factors, the relative importance of those factors may be more similar among those groups. While this finding would need a more complex study to examine this apparent contradiction, one possible explanation is that many individual choice factors weigh more heavily in the decision-making process when students are studying internationally.

8.2 Summary of Findings to Research Question 2.

This thesis also sought to determine if there were differences in the importance placed on rankings by different IGS sub-populations (e.g. age, discipline, gender, etc.). Table 27

summarizes findings from analysis conducted into the various demographic groups in the IGS samples from the two surveys. Included in the table are the bivariate comparisons made using the ordinal version of the LTRS Rating variable among those demographic groups. Also shown is a summary of the significance levels from the binary logistic regression, which used all of the demographic factors as independent variables and the dichotomous version of the LTRS Rating variable as the dependent variable. That dichotomous version classified respondents as those who placed some level of importance on rankings and those who did not.

Table 27: Importance of Rankings Summary: International Student Demographic Group Comparisons

	Bivariate Analyses				Logistic Regression	
	2007 Survey		2009 Survey		2007 Survey	2009 Survey
Demographic Group	EU/EFTA IGS	Other IGS	EU/EFTA IGS	Other IGS		
Degree Level	*	**	ns	ns	***	ns
Age (Master)	ns	ns	ns	ns	ns	ns
Age (Doctoral)	ns	ns	*	ns		
Gender	ns	ns	ns	ns	ns	ns
Discipline[1]	ns	ns	***	ns	ns	ns
Country of Study	**	*	ns	**	**	ns
UNESCO Region of Origin	***		ns		***	ns
World Bank Income Level	***		*		***	ns
Nationality[2]	***		ns		-	-
EU/EFTA or Other IGS	***		ns		***	ns

* $p < .05$, ** $p < .01$, *** $p < .001$, ns = not significant at $\alpha < .05$

1. For the 2009 EU/EFTA sample, Discipline was just over significance at $p = .051$. In the 2009 regression, it was also just over significant using UNESCO region ($p = .051$), but was significant using Income ($p = .020$).
2. Nationality was not included in the regression due to the small sample sizes for most nationalities.

The bivariate analysis of the 2007 sample showed that the importance of rankings varied significantly among both EU/EFTA IGS and Other IGS within the various degree level and country of study groups. In addition, the analyses which combined the two IGS groups found significant variation in the importance placed on rankings based on EU/EFTA or Other IGS status, nationality, UNESCO region of origin, and World Bank income level. Age, gender and discipline did not play a significant role in the importance respondents in the 2007 sample placed on rankings. There was no change among the significant or insignificant demographic factors when comparing results of the bivariate analysis with the binary logistic regression.

Among IGS in the 2009 sample, few significant differences were found in the importance placed on rankings among the demographic groups. No demographic category showed

significant differences for both IGS groups. One near exception was country of study, which was significant for Other IGS, and also significant for EU/EFTA IGS using the dichotomous version of the LTRS Rating variable (p = .016), but not using the ordinal variable (p = .052). No other significant factors were found within the Other IGS group. Within the EU/EFTA IGS group, discipline was a significant factor for the group overall, while age played a significant role in the importance placed on rankings among doctoral students. In the analysis based on the combined sample of the EU/EFTA and IGS groups, only World Bank income level was found to be a significant factor. Degree level and gender were not significant factors within either the EU/EFTA or Other IGS group. With one exception, the few significant demographic factors found among the IGS groups in the 2009 sample were no longer significant in the logistic regression models. The exception was discipline which was significant when using World Bank income level rather than the UNESCO region.

The analysis of the 2007 and 2009 samples clearly have somewhat contradictory findings. As a result, it is difficult to make conclusions regarding the potential importance of the various demographic factors examined. Part of the difficulty is that it is unknown if the variation in findings between the two samples can be traced to disciplinary differences in the two samples, the time-year difference in the surveys, or a combination of the two. Unfortunately since minimal previous work has been done into the role of LTRS in international graduate student choice it is not possible to use previous results to help understand this contradiction.

Nevertheless results of the analysis of the two samples did suggest some potential important differences among IGS. In both the bivariate and regression analysis of the 2007 sample, country of study, as well as the four variables based on the student's country of origin (nationality, UNESCO region, World Bank income level, and EU/EFTA or Other IGS status) all showed significant variation among categories in those demographic groups. In the bivariate analysis of the 2009 sample, country of study was a significant factor among the Other IGS group, and was also significant for EU/EFTA IGS using the dichotomous version of the LTRS Rating variable. World Bank income level was significant for the two groups combined. Although country of study, World Bank income level, and EU/EFTA or Other IGS status were not significant in the regression analysis for the 2009 sample, their significance values were relatively low (p = .110, p = .085, and p = .092 respectively). In addition there were significant differences between specific groups in the country of study and World Bank

income level categories, including IGS studying in seven other countries placing significantly less importance on rankings than IGS studying in the UK.

So taken as a whole the findings presented above, and in the previous chapter, suggest that age and gender played little role in the importance placed on rankings by the IGS in the 2007 and 2009 sample. Degree level and discipline were significant factors, but only within specific groups in the samples. Although it was not conclusive for some demographic groups, it appears that the geographic factors included in the analysis played the most substantial role among the two IGS samples in the relative importance placed on rankings.

8.3 Relating Findings to Student Choice Theory

The samples examined in this thesis came from a single question asking respondents to rate the importance of various factors in their choice of a HEI. Consequently, results from that question cannot be considered to have fully captured the complete decision-making process students underwent in making that choice. The models presented in Chapter 4 articulate that student choice is a multi-stage decision-making process. The results from the student choice question analyzed for this thesis can be related to the choice stage in Hossler and Gallagher's model (1987) as well as in the two models developed by Ruby (2007) and Chen (2007b) which drew upon Hossler and Gallagher's work to develop frameworks to understand international graduate student choice.

Both Ruby and Chen presented international graduate student choice as a complex process in which many factors influenced students during the choice stage and led to selection of a specific HEI. The analysis of 2007 and 2009 surveys results showed that overall international graduate students in the samples rated two-thirds of the factors included in the surveys at some level of importance in their HEI choice. Therefore, results from this thesis are consistent with Ruby and Chen's models and show that the final stage of the decision-making process for international graduate students in the samples was influenced by a wide range of factors.

Chen and Ruby's models of international graduate student choice, as well as Cubillo, Sánchez, and Cerviño's (2006) general international student choice model, all incorporate rankings as an influential factor in the selection of a HEI. Thus the finding of this thesis that the international graduate students in both samples rated rankings as important in their HEI choice is consistent with previous theory. While Ruby and Cubillo, Sánchez, and Cerviño's models placed rankings as an influential factor in the final choice stage of international

student decision-making, Chen's model suggested LTRS may have substantial influence in the search/selection/application stage as well. Unfortunately since this thesis could only draw upon a single student choice question, which only queried students about their final choice, the influence of rankings in different student choice stages could not be examined.

Chen's model also incorporated LTRS as an institutional level pull factor in student choice. In addition, Wit et al. model included rankings as both a push and pull educational factor in their framework designed to understand student mobility flows from a regional perspective (2008). While Mazzarol and Soutar did not include LTRS specifically in the push/pull factors in their model, rankings can be related to their academic quality factor (2002). They placed that factor as a pull factor at both the national and HEI level. The results of this thesis which showed international graduate students, particularly those from outside the EU/EFTA region, rated ranking as important to their choice of a HEI is consistent with those push-pull theory based models. In addition, Wit's evaluation of the EU/EFTA region showed that rankings were a less important factor in outbound mobility from the region, than inbound mobility (2008b). This is also consistent with the findings of this thesis which showed that international graduate students from outside the EU/EFTA region placed the highest importance on rankings in the samples, followed by EU/EFTA international students, and lastly the domestic graduates in the samples.

8.4 Limitations

Some of the limitations of this study were discussed in previous chapters. Actions were taken in attempts to account for some limitations identified with the dataset used for this thesis. Among those actions was the introduction of the dichotomous version of the LTRS Rating variable to provide an alternative measurement to compensate for the potential cultural bias that can be introduced when using a Likert-type rating scale among culturally diverse groups. In addition, extensive data verification efforts were undertaken in an attempt to identify respondents exhibiting response sets (e.g. same response to all questions). This was complicated by the fact that the surveys did not use reverse phrasing in the design of items in the Likert-type questions to help identify such respondents.

Since the survey data came from a pre-existing survey, other limitations were indentified for which measures could not be taken. One of these limitations is that the survey was only offered to respondents in English. Most of the HEIs involved in the survey were in non-

English speaking countries. Consequently, there may have been some bias introduced due to differences in the relative English capabilities among students in different countries and HEIs. As an example, students with a better understanding of English may have been more likely to complete the survey. Thus the respondents may not be representative of all students at the participating HEIs, particularly those studying in non-English language degree programs.

In addition, there are two other areas of concern which may limit the generalizability of the findings from this thesis. The presence of 82 HEIs in 19 countries provided a rich dataset. However, while the response rate is known for HEIs, the student sampling frame is less clear. Consequently, the dataset should be viewed as a convenience sample, since it unknown to what extent random sampling was used among the many HEIs involved. Thus, respondents in the dataset may not be representative of all graduate students at the participating HEIs.

The second area of concern is related to the participating HEIs. In addition to being included in the *CHE ExcellenceRanking*, most HEIs were also ranked in the 2009 SJTU and THE-QS rankings (62 and 70 respectively). As a result, the dataset provides an excellent resource for evaluating the importance of LTRS to students at internationally ranked HEIs. However, the standing of the HEIs in the samples also limits the generalizability of the findings from this thesis to graduate students studying at HEIs that are not included in international rankings.

The final limitation of note is related to the design of the surveys. The collection of data regarding student choice factors was of secondary importance in these surveys since they were primarily created to gather student evaluations of their HEI and degree program, for use in the *CHE ExcellenceRanking*. Each of the choice factors included in the surveys, including rankings, relied on a single Likert-type item to evaluate the importance of that factor in the choice of a HEI by students. While this is fairly common in student choice studies, the use of a single question to evaluate a complex concept such as student decision-making "may fail to capture a respondent's attitude to an issue or behaviour (Hardy and Bryman, 2009, pg. 21)."

8.5 Recommendations for Future Research

Although the dataset used in this thesis did have some noteworthy limitations, it did provide an opportunity to undertake an exploratory study to help fill the large research gap that exists in this area of international graduate student decision-making. The dataset also provided the unique opportunity to address a previously unstudied aspect of student choice, namely the potential differences in the importance of LTRS in the choice of a HEI between domestic and

international graduate students. The analysis of the responses from the 2007 and 2009 samples showed that at least one group of IGS placed more importance on LTRS in their choice of a HEI than domestic graduate students. Consequently, the first line of research suggested by this thesis is to confirm or refute that finding.

The analysis presented in this thesis also suggested that some demographic factors, particularly those related to a student's country of study and origin, also play a significant role in the importance placed on rankings among some IGS populations. However, there were some conflicting results from the 2007 and 2009 samples. Of the demographic variables examined, only gender did not play a role in at least one of the comparisons among the EU/EFTA and Other IGS groups in this study. As a result, further research is needed to clarify the role of various demographic factors in the importance of rankings to IGS choice.

This thesis, like most other student choice studies, relied on a single indicator to evaluate the relative importance different student groups placed on rankings. However, the use of a single indicator is likely not sufficient to measure that complex relationship effectively. Thus, this research area would likely benefit from a study dedicated specifically to understanding the relationship between LTRS and international student choice. A dedicated study would allow that relationship to be examined at a much higher level of detail, which could reveal more subtle differences and interactions between international students and the influence of LTRS. As an example, no study found to date has examined whether international students rely on both national and global LTRS in their decision-making, and if one type of ranking is more influential in their final selection of a HEI.

Another area that could be explored through a more complex study is an evaluation of the importance of rankings in the different stages of the international student decision-making process. While, existing student choice models suggest different factors play a role in the various stages of that process, to date minimal research has been conducted to examine the role of LTRS in those stages among international students.

Finally while some research has indicated rankings may be a substantial pull factor towards institutions as well as countries, minimal research has conducted to confirm such a relationship. In addition, the suggestion from Wit et al. that rankings may also function as a push factor for students in nations with poorly ranked higher education systems is also an interesting potential line of inquiry (2008). As a result, a study created to examine the

interaction between LTRS performance in the home country of international students compared to the standing of their chosen HEI, as well as their country of study in general, would provide useful information to clarify the role of LTRS as both a push and pull factor.

Despite the high profile international student mobility and LTRS both have in higher education, surprisingly little research has been conducted into the interaction between them. Since the numbers of LTRS and international students are both expected to continue expanding in coming years, it is important for the higher education community to gain a better understanding of the relationship between LTRS and international student choice. While the findings from this thesis provide a valuable starting point in regards to international graduate students, this study utilized an existing survey instrument that did not allow subtleties in that relationship to be explored. Consequently, the undertaking of a more complex study dedicated to gaining an in-depth understanding of that relationship will be a key development in advancing the knowledge of these two important aspects of higher education.

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Appendix A: Summaries of Previous Student Choice Studies

(ACA, 2005) EU - International Undergraduate/Graduate Student Study

This study was sponsored by the European Commission's Directorate for Education and Culture to "develop recommendations for a European brand on the basis of the 'perceptions of European higher education' of a wide range of stakeholders outside of Europe, the core group of which were present and future students in higher education (ACA, 2005, pg. 7)." One of the lines of investigation in the study involved asking prospective international students (non-EU) to indentify the importance of a range of 12 factors in their potential choice of a HEI. The study was focused on students from Brazil, China, India, Mexico, Russia, and Thailand, which made up the bulk of the sample, but also included students from other areas of the world through an online questionnaire. The resulting sample of 16,423 international students represents one of the largest studies into student choice in that context. Unfortunately the results were presented with the data for undergraduate and graduate students combined. The study did show the percentage of the total sample pursuing different degree levels and other study options. Approximately 60% of responding students indicated they intended to pursue a Master's or PhD degree in their time abroad.

While LTRS were not used as a factor in the study's question regarding the choice of a HEI, a different question asked students "To what extent would the following means and programmes enhance the attractiveness of studying in the European Union? (ACA, 2005, pg. 167)." A large majority (81%) of the prospective students from the six target countries stated that an EU-wide ranking of HEIs and programs would enhance the attractiveness of studying in the area. However, there was variation in the importance different nationalities placed on a potential EU-wide LTRS, ranging from 74% of Thai students to 86% for those from India. Nonetheless, this was the second highest rated of eleven possible developments after increased financial support for non-EU international students, for the target country students as well as for those from other regions of the world. This ranked ahead of other developments including ones being fostered by the Bologna Process, including the introduction of ECTS, Diploma Supplements, and Bachelor and Master degrees in all countries.

Another question in the study asked prospective students to indentify how they expect their choice process would proceed once they decided to study internationally. Of the respondents, 50% stated they would choose the country first and then the HEI. This compared to 28% who would select the HEI first, 17% who would select a region, then a country and then a HEI, and 5% would first choose a region and then a university. However, as in the other questions presented above there were strong regional/national differences in student responses. As an example, in regards to their choice process proceeding from country selection to HEI selection, responses ranged from a low of 38% for students from Sub-Saharan Africa to 60% to those from Thailand.

(AEI, 2003) Australia - International Undergraduate/Graduate Student Study

This large-scale study in Australia examined the relative importance of 14 factors related to HEI choice among 1956 students from 82 countries studying at 66 education providers in Australia. Of those students 1004 were enrolled in higher education at or above the undergraduate level (621 undergraduate and 383 graduate students). The results showed the top five choice factors (4-point Likert-type response format, 1 = very important) as: program

quality ($\bar{x}$ = 1.55), program reputation ($\bar{x}$ = 1.94), recognized qualifications ($\bar{x}$ = 2.07), HEI facilities ($\bar{x}$ = 2.17), and reputation for treatment of international students ($\bar{x}$ = 2.26).

(Allen and Higgins, 1994) UK - International Undergraduate Student Study

This study involved a large-scale survey of international undergraduate students at 83 HEIs in the UK (cited in McNamara and Harris, 1997) and identified the top three factors in HEI choice to be: HEI's academic reputation, program offered, and HEI entry requirements. In addition, their study found that a HEI's academic reputation was significantly more important to students attending pre-1992 universities than to those at newer institutions.

(Art and Science Group, 1995) US - Domestic Undergraduate Student Study including LTRS as an Information Source

This study, conducted by the Art and Science Group, surveyed 500 high school seniors in the US about sources of information that were useful in their HEI search. LTRS were used by 54% of respondents; the 10th most used source out of 14 examined. However, fewer students reported LTRS were valuable sources of information where it ranked 12th, with 21% reporting it as extremely valuable. The most valuable sources of information for students were: students at the HEI, admission representatives, parents, HEI prospectus, and HEI brochures

(Bowman and Bastedo, 2009) see (Monks and Ehrenberg, 1999)

(Briggs and Wilson, 2007) UK - Domestic Undergraduate Student Study including LTRS as an Information Source

Briggs and Wilson used a disciplinary perspective and evaluated the relative importance of ten information sources, including LTRS, among 749 accounting and engineering undergraduates at six Scottish HEIs. They asked students to rate the importance of each source on a ten-point scale resulting in the following top sources: HEI prospectus ($\bar{x}$ = 7.8), HEI visit ($\bar{x}$ = 6.0), HEI website ($\bar{x}$ = 5.5), word of mouth ($\bar{x}$ = 5.4), influence of peers ($\bar{x}$ = 1.9), and LTRS ($\bar{x}$ = 1.8). They also noted significant differences in the importance of LTRS between students attending pre-1992 universities ($\bar{x}$ = 2.3) and newer HEIs ($\bar{x}$ = 1.0). LTRS were also more important to accounting students ($\bar{x}$ = 2.0) than engineering students ($\bar{x}$ = 1.5) and to male accounting students than females.

(Cantwell, Luca and Lee, 2009) US - International Undergraduate/Graduate Student Study including LTRS as a Choice Factor

This represents a rare study that examined international students in a developing country (Mexico), and regional differences in the importance placed on eight choice factors. The study involved 279 students and found those from North American and Europe were more focused towards experience and short-term study, while students from Latin America were more interested in the academic nature of their study. They also examined how groups varied in terms of eight factors related to their choice to study in Mexico and found significant differences for five of the eight variables. Of those factors, LTRS ranged from first in importance (3-point scale) among students from Latin America ($\bar{x}$ = 2.40), to second for North American students ($\bar{x}$ = 2.02), to the third most important factor for European students ($\bar{x}$ = 1.91). This study did not provide the percentage of graduate and undergraduate students.

(Chen, 2006; 2007a; 2007b; 2008) Canada - International Graduate Student Study including LTRS as a Choice Factor

Chen's study represents the only one identified that examined international graduate students and directly included LTRS as a choice factor. Her study looked at the choice process of 140 East Asian (China, Hong Kong, Japan, Korea, and Taiwan) graduate students at two universities in Toronto. The survey asked students about the importance of different factors in their choice of Canada as a destination, as well as of a specific HEI. Out of 33 possible factors related to choice of a HEI, the top five criteria (5-point Likert-type response format) were: HEI reputation ($\bar{x}$ = 4.12), HEI quality ($\bar{x}$ = 4.12), availability of financial aid ($\bar{x}$ = 4.11), program quality ($\bar{x}$ = 4.09), program reputation ($\bar{x}$ = 4.04). The two factors related to LTRS were next in importance: HEI rank ($\bar{x}$ = 3.94) and program rank ($\bar{x}$ =3.87).

Chen's study also looked for significant differences in each choice factor among various sub-populations within her sample. While no differences were found in regards to LTRS based on gender or level of study (i.e. master vs. doctoral), differences were found in relation to country of origin, discipline, and type of program. In regards to the later, students in professional programs rated program rank ($\bar{x}$ = 4.21) as the most important factor in their choice of a HEI, while HEI rank ($\bar{x}$ = 3.76) was the 7th most important factor for this group. In comparison, students in research-based programs placed HEI rank ($\bar{x}$ = 4.01) as more important (5th) compared to program rank ($\bar{x}$ = 3.73). While Chen did not present underlying data, she mentioned that HEI and program rank were more important for students from China, Hong Kong, and Taiwan than for those from Japan and Korea (Chen, 2007a). She also noted LTRS performance was more important for business and engineering students.

(Connor et al., 1999) UK - Domestic Undergraduate Student Study including LTRS as an Information Source

This large-scale research project was conducted in 1998 and examined undergraduate student choice among over 20,000 applicants to full-time undergraduate studies throughout the UK. The authors noted that the top five choice factors were: programs offered, teaching reputation, academic support facilities, overall HEI image, and graduate employment prospects. LTRS were among the least cited sources of helpful information (less than 3% of students surveyed). The sources of information that were noted as most helpful were: HEI prospectus (40%), HEI visit (26%), UCAS handbook (16%), school careers advisor (10%), and students at the HEI (10%). The study did discover that LTRS were more important to students with higher academic credentials, from higher socio-economic backgrounds, and overseas students.

(Daily, Farewell and Kumar, 2007) US - International Undergraduate/Graduate Student Study

This is one of the few student choice studies that took a multi-institutional approach and involved 50 international students from 27 countries studying business at 8 US HEIs. The study examined the role of 17 factors in choice of a HEI and noted the top five as (6-point Likert-type response format): graduate employment prospects ($\bar{x}$ = 4.98), financial aid ($\bar{x}$ = 4.90), HEI reputation ($\bar{x}$ = 4.82), accessible information about the HEI ($\bar{x}$ = 4.50), and professional accreditation ($\bar{x}$ = 4.42). The study only identified one area of difference among male and female students that was statistically significant, tuition costs. Unfortunately the very small convenience sample used in relation to the large number of HEIs and countries examined in this study leads to significant concerns regarding the validity of the findings.

(Davis and McCarthy, 2005) US - Domestic Graduate Student Study including LTRS as a Choice Factor

This US study examined the role of various factors at the consideration and choice stages of 106 current doctoral marketing students and 240 current MBA students considering such programs. The most important factors found among the MBA population for choosing which HEIs to apply were: reputation of professors, professor-student relationships, HEI ranking, and quality of academic facilities. However, among current doctoral students, rankings were among the least important factors when they made their final choice of which HEI to attend.

(Dawes and Brown, 2002) UK - Domestic Undergraduate Study

This study provides useful information regarding choice behavior among different student sub-populations and investigated information seeking behavior and sources of information used in making enrollment decisions among 266 undergraduate business students at one HEI in the UK. The authors found only minor differences based on gender. However, different ethnic and age groups were found to have significant differences in the information used.

(Eccles, 2002) UK - Domestic Undergraduate Study based on LTRS and Application Data

This UK study looked at the share of applications particular HEIs received in comparison to changes in their rank in *The Times* league table. Eccles concluded annual changes in LTRS performance have little or no effect on student choice based upon applications. However, it is not clear from the study why the eight HEIs he examined in detail were chosen. This casts some doubts as to how representative the results are of UK HEIs and in turn how generalizable they are out of that country's context.

(GMAC, 2008; 2009) Domestic/International Graduate Student Study including LTRS as an Information Source and Choice Factor

This detailed study (2008) surveyed registrants of a MBA website (mba.com). The 5637 respondents were asked, among other questions, about the role LTRS played in their search and ultimate choice of a program. The study found few significant differences among groups based on gender or age. A larger number of significant differences were found when considering regions, sub-regions, and individual countries. For the four regional populations considered, as an information source, LTRS were among the most often consulted among the 20 sources examined: Europe (1st, 51%), Asia/Pacific (4th, 41%), Americas (5th, 41%), and Africa/Middle East (7th, 30%). However, when asked how important 23 factors were in the ultimate choice of a program, the ranking of the program was only a mid-level factor in terms of percentage of students reporting it as extremely important: Africa/Middle East (13th, 33%), Asia/Pacific (13th, 26%), Europe (12th, 25%), and Americas (13th, 23%). It should be noted that these regions do not necessarily indicate international student status. The study did not differentiate responses on this status. As a result, each category, particularly those from Europe and the Americas likely include a mixture of students planning to study in domestic MBA programs, and those planning to study in MBA programs in other countries.

In a follow-up study (2009), a survey of 1003 prospective MBA students from throughout the world found LTRS to be the 7th most important ($\bar{x}$ = 6.0, 7-point Likert-type response format) of nine factors examined related to academic quality and reputation. The top five factors indentified were: quality of professors ($\bar{x}$ = 6.4), job placement reputation ($\bar{x}$ = 6.3), program

accreditation ($\bar{x}$ = 6.1), local reputation ($\bar{x}$ = 6.1), and academic rigor ($\bar{x}$ = 6.0). The study did not find significant differences based on gender or age, but did in regards to region of citizenship: Africa ($\bar{x}$ = 6.2), Europe ($\bar{x}$ = 6.1), Asia/Pacific ($\bar{x}$ = 6.0), Americas ($\bar{x}$ = 5.7).

(Griffith and Rask, 2007) US - Domestic Undergraduate Study based on LTRS and Application Data

Griffith and Rask used data regarding student applications and final choice from 1995 to 2004 at highly ranked HEIs based on results in the USNWR ranking. They concluded LTRS standing was an important factor for high ability students who showed a preference for highly ranked HEIs. This preference was prevalent after adjusting for other factors related to institutional quality. In addition, importance of LTRS was stronger at higher ranked HEIs, among full-fee paying students, and the impact of LTRS has increased over time.

(Hachmeister and Hennings, 2007) Germany - Domestic Undergraduate Student Study including LTRS as a Choice Factor

This study is based on results from the ongoing student surveys that take place as part of the *CHE University Ranking* of German HEIs at the Centre for Higher Education Development (CHE). In the surveys, undergraduate students (with more than one year of studies) are asked to rate the importance (6-point Likert-type response format, 1 = highest) of six factors in their choice of a HEI. For the 2005-07 survey cycle, students across all programs and HEIs reported the following top five factors (mean response, percentage answering 1 or 2): subject related reasons ($\bar{x}$ = 2.3, 66%), good reputation of HEI and professors ($\bar{x}$ = 2.6, 59%), location (close to home) ($\bar{x}$ = 2.8, 58%), attractive campus ($\bar{x}$ = 3.0, 51%), and good ranking results ($\bar{x}$ = 3.5, 34%). The study also presented disciplinary differences among students answering 1 or 2 in the importance of different factors. In regards to ranking results these ranged from a high of 47% for electrical engineering students at universities, to the lowest group, students studying social sciences/sociology/political science, of whom 20% reported a high importance of rankings. The results for other disciplines of interest to the this project were: psychology 41%, economics 38%, physics 35%, biology 32%, math 31%, and chemistry 31%.

(HEFCE, 1999) UK - Domestic Undergraduate Student Study including LTRS as an Information Source

This UK study surveyed first-year undergraduates and found that LTRS were an influential source of information in the choice of an HEI for 34% of 661 respondents. This represented the 9th most influential factor out of 17 examined. The most influential sources were: HEI prospectus (80%), friends/fellow students (64%), HEI open days (60%), parents (59%), and advisory or guidance services (56%). The study noted that LTRS were much more influential (50%) for high-achieving students than for students with the lowest qualifications (12%).

(Heine et al., 2008; Lewin et al., 2002) Germany - Domestic Undergraduate Student Study including LTRS as an Information Source and Choice Factor

This is a bi-yearly study in Germany of first-year undergraduates from Higher Education Information System (HIS). Their most recent survey, conducted in 2007/08 at 71 HEIs, included 8342 student responses regarding their most used information sources as: Internet (99%), written information from the HEI (86%), friends (84%), media (80%), and parents

(77%). LTRS were the 7th most used source (66%). However, LTRS were the 5th most cited source in terms of usefulness (50%) after the Internet (84%), written information from the HEI (61%), HEI visits (59%), and students at the HEI (57%). The study did not find differences in use based on gender. The longitudinal aspect of this ongoing project provides an insight into the use of LTRS over time. Comparing the results from 2007/08 to the survey conducted in 2000/01, use of LTRS has increased from 55% to 66%, while those citing LTRS as useful has increased from 34% to 50%.

The study also examines the percentage of students who rated each of 19 factors as important or very important (5-point Likert-type response format) in their choice of a HEI. The factors with the most responses to those two choices combined were: program offered (83%), location (close to home) (66%), HEI reputation (60%), good facilities (54%), and HEI atmosphere (48%). In comparison, LTRS performance was ranked 9th (34%). The study did note a difference among males (38%) and females (31%) in the relative importance of LTRS. Differences in importance of LTRS based on discipline were also noted, ranging from the highest level of importance for students studying law (49%) to a low of 19% for students in the arts. For areas related to the current project, 41% of mathematics/natural science and 37% of economics/social science students reported that LTRS were important in their choice of HEI. In addition, the influence of LTRS to the overall student population has increased from 30% for respondents in the 2000/01 study, to 34% for students in the 2007/08 survey.

(HERI, 2007; HERI, 2008) See (McDonough et al., 1998)

Higher Expectations 2007/08: UK - Domestic Undergraduate Student Study including LTRS as an Information Source

This is a large-scale British study conducted by Opinionpanel Research and The Knowledge Partnership. The full results of this research are only available to paid subscribers of the Higher Expectations benchmarking service and neither organization responded to requests for further details on their results. However, some results are available from other sources which are cited here. The study involved over 13,000 first-year undergraduates. Among domestic students in the study, 61% reported using at least one LTRS and 54% stated it was an important or very important factor in their choice of HEI, compared to 70% and 64% respectively among the international students in the survey (cited in Roberts and Thompson, 2007). The percentage of students reporting that LTRS were very important also varied dramatically between students studying at research-intensive universities (33%) and those at other types of HEIs (6%) (cited in 1994 Group, 2008).

(Howard, 2002) See (McDonough et al., 1998)

(Hoyt and Brown, 2003) US - Domestic Undergraduate Student Study

In a literature review of 22 studies in the US into undergraduate student choice between 1974 and 2002, Hoyt and Brown combined the results from 30,614 student responses to compile a list of choice factors that were most cited as influential in the reviewed studies. The list in order of frequency is: academic reputation, location, teaching quality, programs offered, quality of professors, costs, reputable program, financial aid, graduate employment prospects.

(Joseph and Joseph, 2000) New Zealand - International Undergraduate Student Study

This study queried 110 Indonesian students planning to enroll in undergraduate programs in New Zealand. The authors examined the importance of 17 choice factors and determined the top five factors (5-point Likert-type response format): resources available ($\bar{x}$ = 4.36), reputable degree program ($\bar{x}$ = 4.33), learning environment ($\bar{x}$ = 4.28), graduate employment prospects ($\bar{x}$ = 4.19), and a clean and safe environment ($\bar{x}$ = 4.14). The sample was also examined based on gender, but only 2 out of 17 differences were statistically significant.

(Kallio, 1995) US - Domestic Graduate Student Study

Among the findings in Kalio's study into the choice process of 1068 graduate students at the University of Michigan was that gender did not play an important role in student choice. However, she did find the age of students had some effect on the importance of certain factors in those decisions. Students over 30 placed a greater emphasis on factors related to current family and work commitments. Students under 30 were more interested in social aspects of the program and HEI and were willing to travel further to continue their studies. Through factor analysis she identified six primary factors that influenced students: residency status, HEI and program academic environment, current work-related concerns, spouse considerations, financial aid, social environment.

(Keskinen, Tiuraniemi and Liimola, 2008) Finland - Domestic Undergraduate Student Study

This Finnish survey of 1668 prospective psychology students found that uniqueness of the specific program or department was the primary reason for students to choose a particular HEI. They also noted that location was an important factor in the student decisions.

(Kim, 2001) US - International Undergraduate Student Study

Kim identified academic reputation as the most important factor in her study of international undergraduate students at three public HEIs in New York.

(Lee, 2008) US - International Undergraduate/Graduate Student Study

This institutional investigation of the role of nine different factors among 501 international students at a large university in the Southwest US indentified the following top five (5-point Likert-type response format): HEI reputation ($\bar{x}$ = 3.78), low tuition ($\bar{x}$ = 3.22), offered employment-based financial aid ($\bar{x}$ = 3.02), offered non-employment-based financial aid ($\bar{x}$ = 2.83), and specific program available ($\bar{x}$ = 2.73). However, the fact that only three factors had a mean above neutral raises some questions as to the selection of these particular factors as influencers in student choice. The study found few statistically significant differences among different international student populations. Only two factors were shown to be significantly different based upon gender. In addition, only two such differences were found based on a student's region of origin. The most interesting of those differences to the current study is that students from Southeast Asia rated academic reputation much higher ($\bar{x}$ = 4.32) than students from Africa ($\bar{x}$ = 3.00). No significant differences related to students coming from developed or developing countries were identified among the nine factors related to institutional choice.

(LHI, 2006) US - Domestic Undergraduate Student Study including LTRS as a Choice Factor

This US study examined the role of LTRS as both an information tool and deciding factor among 600 high achieving high school students just before HEI enrollment. While 34% of students reported using LTRS as an information tool to decide where to apply (14th of 16 sources), 46% reported that a high USNWR ranking played a role in where they applied (12th of 16 factors). In addition, 55% reported that a high USNWR ranking was important or very important in their ultimate decision of which HEI to attend (8th of 16 factors). The report also noted that the highest-achieving students, as well as Asian-Americans, placed higher importance on LTRS than other students. A strong regional difference in use of LTRS as an information tool was also found, with 51% of students in the Mid-Atlantic (New Jersey, New York, Pennsylvania) reporting they used LTRS to help decide which HEIs to apply at, compared to 25-36% in the other four regions examined.

(Li and Bray, 2007) Hong Kong - International Undergraduate/Graduate Student Study

This study represents an interesting variation of international student choice studies by focusing on mainland Chinese students planning to study in Hong Kong and Macau. Li and Bray used a combination of quantitative and qualitative methods (323 surveyed, 28 interviewed) and found that factors which influenced students to choose Hong Kong varied significantly from students who chose Macau.

(Lin, 1997) Netherlands - Domestic Undergraduate Student Study

This study of undergraduate students at seven Dutch HEIs identified the following most significant factors in student choice: teaching quality, graduate employment prospects, HEI reputation, internship opportunities, and professor qualifications.

(Malaney, 1987) US - Domestic Graduate Student Study

This early choice study of 1073 graduate students at a US HEI found the top three choice factors to be: academic reputation, financial aid, and location. The author also determined differences based upon gender, age, ethnicity, and citizenship in regards to information sources used and in factors for selecting a HEI.

(McDonough et al., 1998), (HERI, 2007; 2008), and (Howard, 2002) US - Domestic Undergraduate Student Studies including LTRS as a Choice Factor

McDonough et al. conducted what remains one of the most detailed studies into the use of LTRS among different undergraduate student populations when they analyzed responses from the CIRP[31] survey from 1995. This was the first year to include a question related to rankings in the choice of a HEI. Their sample included 221,897 students at 432 4-year colleges and universities. The question they examined from the CIRP data asked students to rate the

[31]A number of US research projects over the past decade have utilized data from the Cooperative Institutional Research Program (CIRP) Freshman Survey. The survey has been conducted yearly since 1966 by the Higher Education Research Institute (HERI) at UCLA and includes responses from several hundred thousand entering undergraduates each year from roughly 700 HEIs. Information is available at http://www.gseis.ucla.edu/heri/cirpoverview.

importance of various factors in their decision-making as either “not important”, “somewhat important” or “very important.” In regards to LTRS, 60% responded that they were not important, 30% somewhat important, and 10% very important. However, the selectivity (based on mean freshman SAT scores) of the HEI attended was an important predictor of the importance of LTRS to the HEI’s students. For students at the most selective HEIs, 33% reported rankings as very important and 46% as somewhat important. Students at institutions with high selectivity reported the importance of rankings as 18% and 41% respectively. This compares to 6% and 21% for students attending HEIs with the lowest levels of selectivity.

The authors used logistic regression analysis which incorporated student and HEI characteristics to determine odds ratios for various sub-samples among those who placed some level of importance on rankings. This analysis determined there were no significant differences based upon gender or age. For the seven ethnic categories examined, only two areas of significance were found. The odds of Asian-Americans were 1.26 times as likely as other groups to report rankings as important, while Chicano/a students were 0.69 times less likely to do so. The groups with the highest significant odds ratios were: non-US citizen (1.51), students concerned with the reputation of their HEI (1.51), those attending public universities (1.43), those attending private universities (1.36), and those from upper social classes (1.35). While non-US citizens are not necessarily international students (some are likely permanent residents), international students likely make up a substantial portion of the group. As a result, the higher level of importance placed on rankings by this group overall does suggest rankings were likely more important to international students. The authors also noted this strong relationship was present even after controlling for the effects of ethnicity.

HERI released a follow up to the McDonough et al. study based upon data from the 2006 CIRP survey (HERI, 2007). While not providing the same level of detail for the various student populations as the previous study, it does provide a valuable look at the rising importance of rankings among undergraduate students in the US. The results in Table 28 compare results from the 1995 and 2006 studies, as well as data from the most recent CIRP study. These results show there was a considerable increase in the percentage of students reporting that rankings were important in their choice of a HEI (HERI, 2008).

Table 28: Importance of Rankings in National Magazines (US) in Student Choice

Importance of Rankings	1995	2006	2008	% Increase
Very Important	10.5%	16.4%	17.6%	67.6%
Somewhat Important	29.6%	35.2%	35.7%	20.6%
Not Important	59.9%	48.4%	46.7%	-22.0%

Source: (HERI, 2007; 2008; McDonough et al., 1998)

While the 67.6% increase in the percentage of students rating rankings as very important to their choice was the largest increase of any of the factors in the study, rankings remained in the middle compared to other choice factors. LTRS were the 11th most likely factor of 21 to be cited as somewhat or very important (53%) by students in the 2008 CIRP survey, while the top factors were: HEI reputation (95%), graduate employment prospects (87%), HEI reputation for social activities (83%), financial aid offered (79%), and HEI visit (78%).

The 2006 follow-up study also noted that while there had been increases in importance across all racial groups, rankings were still of greatest importance to Asian-Americans (HERI, 2007). They also reconfirmed the findings of the 1995 study that the more selective a HEI the student

attends, the more likely they were to place greater importance on rankings. Students attending universities rather than colleges, and students with higher academic credentials were also still more likely to rate LTRS as important. Unfortunately the study did not comment on any changes in importance based on citizenship. However, the report did add an area of interest to this project, by noting the percentage of students citing rankings as very important by discipline. Of the groups being investigated in this project, 18% of Natural Science and 15% of Social Science students rated rankings as very important in their choice

Howard (2002) also used CIRP data, from 2000, in her study. Most of her findings were similar to those of McDonough et al. Those that differed may have resulted from the smaller data subset used. That subset of 40 HEIs (10 each from the top tier and fourth tier of two categories of the USNWR ranking: Best National Universities and Best National Liberal Arts Colleges), did allow Howard to examine a research question the earlier study did not; different levels of importance of LTRS among students attending highly ranked HEIs compared to lower ranked HEIs. Her findings, indicated in Table 29, clearly show students attending higher ranked HEIs were more likely to rate LTRS as important in their choice.

Table 29: Importance of Rankings in National Magazines (US) in Student Choice at National Universities and Liberal Arts Colleges

Importance of Rankings	Top-tier National University	4th-tier National University	Top-tier National Liberal Arts College	4th-tier National Liberal Arts College
Very Important	30.8%	6.5%	28.2%	7.7%
Somewhat Important	46.0%	25.3%	49.0%	28.4%
Not Important	23.2%	68.1%	22.8%	63.9%

Source: (Howard, 2002)

Teranishi et al. (2004) also used CIRP data from 1997 to examine the importance of LTRS for sub-populations of Asian-Americans, the racial group found by McDonough et al. to be most likely to report LTRS as very important. The authors examined 18,106 student responses and found distinct differences, with 19.6% of Chinese-Americans reporting LTRS were very important, compared to Korean-Americans 17.5%, Southeast Asian-Americans 16.5%, Filipino-Americans 14.7%, and Japanese-Americans 12.2%. Their findings reveal that the value of LTRS can vary notably even within ethnic groups from similar geographic regions.

(Meredith, 2004) See (Monks and Ehrenberg, 1999)

(Monks and Ehrenberg, 1999) and (Meredith, 2004) and (Bowman and Bastedo, 2009)
US - Domestic Undergraduate Studies based on LTRS and Application Data

Monks and Ehrenberg conducted one of the first studies to evaluate how changes in a HEI's rank in the USNWR institution level rankings impacted admissions at the HEI the following year (1999). The researchers investigated 30 highly ranked private HEIs (i.e. top 25 nationally) and found that between 1988 and 1998 a lower rank resulted in the institution accepting a higher percentage of freshman applicants, that fewer accepted applicants chose to enroll, and that those that did enroll were of lower academic ability based upon SAT scores. These findings were confirmed by Meredith in a similar study employing a different

methodology and a larger group of HEIs (2004). That study also found that the impact of changes in USNWR rank are greater at public universities, and that moving in and out of the top-25 has a greater impact than simply moving up or down in numerical rank. Bowman and Bastedo found similar results in their study looking at the impact of getting on the first page of the USNWR rankings (i.e. top 40 or 50 depending on year) at national universities and liberal arts colleges (2009). Improving rank to being listed on the first page of the rankings had substantial positive impacts on admissions indicators the following year at both types of HEIs. In addition they found that moving up in rank within the top-25 had a substantial impact for national universities, but much less of an impact of liberal arts colleges or upward movement in rank between 50 and 25.

(Montgomery, 2002) US - Domestic Graduate Student Study including LTRS as a Choice Factor

This project involved 4333 students who participated in a longitudinal survey between 1991 and 1994. The study found that males were more likely to be influenced by the rank of the HEI in the USNWR program rankings. In addition, African-Americans and Hispanics also placed a higher importance on program rank than did white students in the study.

(Mueller and Rockerbie, 2005) Canada - Domestic Undergraduate Study based on LTRS and Application Data

This study examined student application data to all ranked universities and colleges (in the *Maclean's* magazine LTRS) in Ontario between 1992 and 2001. The study found that the influence of LTRS was similar for males and females and that improved standing in rankings resulted in increased student applications. They also noted LTRS performance had a stronger influence for students attending medical/doctoral universities.

(Mulvey and Langer, 2003) US - Domestic/International Graduate Student Study

Mulvey and Langer offer one of the only studies that provides a discipline based look at the importance of factors to both international and domestic graduate students. Their study sought to survey all students who enrolled in graduate physics and astronomy programs in the US between 1999 and 2000. They received 1950 responses which represented 37% of all students enrolled in the 252 such programs. They asked students to name the three most important factors in their choice of a HEI from a list of 12 possible factors. The five most frequently cited by international physics students were: financial aid offered (51%), department reputation (46%), HEI reputation (36%), location (36%), and facilities (36%). While American physics students identified three of the same in their top five, the relative importance varied: location (52%), HEI visit (41%), financial aid offered (37%), department reputation (31%), atmosphere of the department (24%). In comparison only 14% of American physics students cited HEI reputation as among their three most important choice factors.

The study also discovered differences between physics and astronomy students, and between US and international astronomy students. The most frequently cited influencing factors for international astronomy students were: department reputation (76%), financial aid offered (36%), HEI reputation (32%), to study with particular professor (32%), and facilities (28%). In contrast, American astronomy students cited only two of those factors among their top five: department reputation (55%), HEI visit (55%), location (39%), facilities (39%), and

atmosphere of the department (27%). In addition, only 9% of American astronomy students noted HEI reputation was among their top three influencing factors.

This study has shown that not only can important factors in choosing a HEI vary significantly among international and domestic students, but factors can also vary significantly even among related disciplines such as astronomy and physics. Of particular interest in this study was the much higher emphasis placed on reputation by international students and that departmental reputation was of greater importance than HEI reputation.

(Oosterbeek, Groot and Hartog, 1992) Netherlands - Domestic Graduate Student Study

This research project in the Netherlands examined five factors related to the choice of a HEI among 2060 doctoral and master economics graduates. Their results showed students rated the following factors as most important in their choice: location (distance from home) (46%), department reputation (37%), attractiveness of the city (16%), friends enrolled there (12%), and religious denomination (11%). However, when looking at responses based on the HEI attended, the authors found very different levels of responses. Those placing more value on certain factors were more likely to have attended particular HEIs. As an example, 64% of students who attended Erasmus Universiteit Rotterdam reported the institution's academic reputation as their most important factor. This is more than double the percentage at any of the other four HEIs, where academic reputation did not rank higher than the third most important factor. They also discovered that a student's social background and gender affected the relative importance placed on the choice factors as well as their ultimate choice of a HEI.

(Pimpa, 2005) Australia - International Undergraduate/Graduate Student Study

This study surveyed 150 Thai students planning to study in Australia about the most important factors in their choice of a HEI. The top five out of 11 factors (6-point Likert-type response format) were: HEI reputation ($\bar{x}$ = 4.45), program of study ($\bar{x}$ = 4.13), teaching reputation ($\bar{x}$ = 4.06), graduate employment prospects ($\bar{x}$ = 3.81), and facilities for international students ($\bar{x}$ = 3.77). HEI reputation was also found to be the most important factor for the undergraduate, master, and doctoral students in the study. The author only identified one factor of the 11 that had a statistically significant difference among those three populations; reputation for teaching quality was of much less importance to doctoral students.

(Pivo, 2005) US - Domestic Graduate Student Study including LTRS as a Choice Factor

Pivo surveyed 2703 master and doctoral applicants in the 2000-01 and 2001-02 academic years at a US HEI. The study looked at the relative importance of 23 factors using a 5-point Likert-type response format. Among the 23 factors were five different types of LTRS. The two most important to students were professional society program ranking (9^{th}, $\bar{x}$ = 3.76) and the USNWR program rankings (10^{th}, $\bar{x}$ = 3.60). The other rankings were much less influential (17^{th}, 20^{th}, 22^{nd}). The researcher also looked at the possible role of ethnicity (white vs. minority), gender, and type of degree (master vs. doctoral) in the importance students placed on various factors. In relation to LTRS, no differences were found based on ethnicity. However, doctoral students ($\bar{x}$ = 3.85) did place a greater importance on professional society program rankings than master students ($\bar{x}$ =3.52). Male master students ($\bar{x}$ = 3.76) rated the USNWR ranking as more important than females ($\bar{x}$ = 3.46). No other significant differences were found based on gender or degree type. The author did note (but did not provide data)

that some disciplinary differences were found and that engineering (computer and electrical), higher education, and management students found LTRS more important than other groups.

(Poock and Love, 2001) US - Domestic Graduate Student Study

Poock and Love queried 180 doctoral higher education administration students at 24 randomly selected HEIs in the US about the relative importance of a large number of choice factors related to their selection of a particular HEI. The overall top five identified factors (5-point Likert-type response format) were location (distance from home) ($\bar{x}$ = 4.19), friendly department professors and staff ($\bar{x}$ = 4.11), availability of evening classes ($\bar{x}$ = 4.10), ability to keep current job ($\bar{x}$ = 4.07), flexibility of program ($\bar{x}$ = 4.07). In comparison, HEI reputation ($\bar{x}$ = 4.04) and program reputation ($\bar{x}$ = 3.88) ranked 7th and 10th respectively.

Their study also examined differences among choice factors based upon gender, race and age. For gender only two of the 27 factors presented were found to have significant differences, compared to seven factors for age groups. These included older students who placed greater importance on factors such as location, availability of evening classes, and ability to take the program part-time. In contrast, parents and family had a greater influence on younger students. None of the identified differences based on age were related to any accreditation or reputational factors. Accreditations did have a significant difference based on race and was more important to African-American students than white or other racial groups. In this area, they also identified 14 other areas of significant difference, suggesting that race played an important role in the importance of choice factors in the project's population, but, as with age, none of those differences were related to reputational factors.

(Purcell et al., 2008) and (UCAS, 2008) UK - International/Domestic Undergraduate Student Study including LTRS as a Choice Factor

These two reports while focused on undergraduate students, are among the most useful studies to date in understanding the role of LTRS in international student decision-making. Both reports are from large-scale longitudinal studies in the UK that are working with a population of all students who applied to full-time undergraduate study through the UK's centralized higher education student application system (UCAS). Both studies provide valuable comparisons between domestic and international students.

Futuretrack is a longitudinal study that will query all full-time UCAS applicants from 2006 at several points in their studies and after graduation (Purcell et al., 2008). This represents a total population of 506,304 students of which 25% (n = 128,260) responded to online surveys in the first stage (after application and prior to HE entry). Of the respondents 6% were EU citizens (non-UK) and 7% were from other countries. Thus, the sample has approximately 17,000 international students. The sample was weighted to reflect identified biases from the total UCAS applicant population. One question in the study asked students to choose, from a list of 21 factors, the reasons why they chose a particular HEI. Table 30 lists the top five factors for students from the UK, the EU (non-UK) and other international students.

Among all accepted students there were differences in regards to HEI type which showed 55% of students choosing Russell Group universities rated LTRS as important in their choice, compared to 43% at other pre-1992 universities, 17% at post-1992 universities, and 11% at other HEIs. Ethnic differences were found among domestic students in the importance placed on LTRS. Asians were most likely to report LTRS as being influential (38%). Regional

differences were also found with 32% of students in England rating LTRS as an important factor, compared to 28% of students in Wales, 22% in Northern Ireland, and 18% in Scotland.

Table 30: Top Five Factors for Choosing a Particular HEI in the UK, by Region

	UK Students	EU Students	Other International
1st	program offered (59%)	program offered (54%)	overall HEI reputation (55%)
2nd	visit to HEI (56%)	overall HEI reputation (50%)	program offered (46%)
3rd	overall HEI reputation (47%)	attractive location (46%)	teaching reputation (44%)
4th	attractive location (41%)	HEI prospectus/website (37%)	league tables (41%)
5th	teaching reputation (40%)	teaching reputation (37%)	attractive location (37%)
LTRS	7th (29%)	6th (36%)	4th (41%)

Source: (Purcell et al., 2008)

The second UCAS applicant study, *Future Leaders 07/08*, involved surveying those who applied through the UCAS in 2007 (UCAS, 2008). The study had a lower response rate (7%) than the *Futuretrack* study (25%), which resulted in 25,301 responses, including 5415 from international students. This study asked students about the importance of 12 factors in their choice of a HEI. The report provides an additional regional category compared to the *Futuretrack* study. The top factors for each group are presented in Table 31, based upon the percentage of each population reporting very important to the respective choice factors.

Table 31: Top Five Factors in Student Choice of UK HEIs, by Region

	UK (n = 19,886)	EU (n = 3047)	Far East (n = 1382)	Africa (n = 549)
1st	teaching quality (51%)	teaching quality (60%)	teaching quality (70%)	teaching quality (75%)
2nd	program reputation (42%)	HEI reputation (45%)	program reputation (62%)	program reputation (61%)
3rd	HEI reputation (40%)	program reputation (43%)	HEI reputation (60%)	HEI reputation (59%)
4th	teaching methods (31%)	teaching methods (36%)	teaching methods (51%)	teaching methods (59%)
5th	entry qualifications required (30%)	position of HEI or program in LTRS (28%)	position of HEI or program in LTRS (42%)	position of HEI or program in LTRS (36%)
LTRS	8th (20%)			

Source: (UCAS, 2008)

(Quacquarelli and Geraghty, 2008) Domestic/International Graduate Student Study including LTRS as an Information Source and Choice Factor

This market research type study which involved a mixture of prospective domestic and international MBA students and provides some insights into the importance of LTRS among various information sources used by graduate students. Among the 2426 respondents, LTRS was found to be the 7th most used out of 13 sources of information with the top five sources being: HEI website, direct contact with HEI admissions office, contact with alumni, education fairs, and specialized MBA websites. The study also gives an insight into the variation between regional groups in terms of their criteria for choosing an MBA program. Only two of 13 choice factors examined were named in the top five for each population: career placement record (ranged from 1st to 5th) and quality of research/academic staff (ranged from 1st to 3rd). HEI rank was of minimal to moderate importance based upon region of origin: Latin America (6th), North America (7th), Europe (7th), Asia (10th), and Africa (10th). However, it should be noted that these regional populations likely included a mixture of students planning to study in their home countries and those looking to study internationally.

(Rawson, 2004) UK - International Undergraduate/Graduate Student Study including LTRS as an Information Source and Choice Factor

Rawson's studied 697 undergraduate and graduate international students enrolled at the University of Loughborough in the UK. Students at the HEI rated the following as most important among 14 information sources in their decision-making (5-point Likert-type response format): Internet ($\bar{x}$ = 4.16), HEI prospectus ($\bar{x}$ = 3.97), information provided by the HEI ($\bar{x}$ = 3.86), LTRS ($\bar{x}$ = 3.73), and careers advisor or teacher ($\bar{x}$ = 3.58). However, when examining the importance of each source among different regional sub-populations, distinct differences emerged. LTRS had the most variation in relative importance of any of the top eight information sources. It ranged from the most important source for students from South East Asia ($\bar{x}$ = 4.12) to the 8th most important source for students from Africa ($\bar{x}$ = 3.27). The rank and value for the other five regions examined were as follows: Indian Subcontinent (3rd, $\bar{x}$ = 4.00), East Asia (3rd, $\bar{x}$ = 3.82), Rest of World (4th, $\bar{x}$ = 3.75), Middle East (7th, $\bar{x}$ = 3.70), and Europe (7th, $\bar{x}$ = 3.43). The study also asked students to rate the importance of seven academic related factors in their choice of the institution (5-point Likert-type response format). The university's ranking in LTRS was 6th ($\bar{x}$ = 3.63) after program content ($\bar{x}$ = 4.39), teaching reputation ($\bar{x}$ = 4.21), HEI reputation ($\bar{x}$ = 4.20), program reputation ($\bar{x}$ = 4.14), and the research rating of the department ($\bar{x}$ = 3.74). Unfortunately, the study did not provide the regional-level detail for this question that it did for the importance of information sources.

(Rees, 2002) Australia - International Undergraduate Student Study

This study of 80 international business students at a university in Melbourne examined the importance of 20 choice factors and with the top factors being (5-point Likert-type response format): recognized qualifications ($\bar{x}$ = 4.30), safe place to study ($\bar{x}$ = 4.04), program reputation ($\bar{x}$ = 4.03), HEI entry requirements ($\bar{x}$ = 3.96), living costs ($\bar{x}$ = 3.90).

(Roberts and Thompson, 2007) UK - International/Domestic Undergraduate Study based on LTRS and Application Data

Using data for full-time undergraduate applications through the UCAS and rank in *The Times University Guide* league table, Roberts and Thompson examined the role of LTRS in the choice of both domestic and international students. They found that for domestic students, the relationship between LTRS position and the share of applications received at that HEI was essentially nil (correlation less than 0.1). However, they did find that the correlation for international students was 0.3, which suggested that LTRS performance is more important to international than domestic students in the UK. For international students they also noted that LTRS had a greater influence for students studying in London. In addition, they found that as HEIs passed into certain higher tiers (i.e. top 10 or top 20) their presence in the higher tier had a slightly positive effect on applications.

(Ruby, 2007) US - International Graduate Student Study including LTRS as an Information Source

This is one of the few studies to look at international graduate student choice. Among her research questions, Ruby sought to explore differences among international student sub-populations in the role of four different categories of characteristics based upon primary choice factors she identified from a detailed literature review (general, financial, reputation, and recruitment/other influences). Her study queried 329 students from 65 countries studying at six US HEIs, and found no significant differences based on gender or age for the four categories. She grouped students into four regions based on country of citizenship and found significant differences in the recruitment/other influences and reputation categories. Recruitment/other influences, which included LTRS[32], were less important to students from Latin America and Europe than students from South or East Asia. The reputation category was less important to European students than to those from South Asia. She found significant differences between populations in all categories based upon the type of program and level of degree. The general category was less important to students in natural sciences than other students. The recruitment/influences category was less important to master students in the arts and social sciences than to doctoral students. Doctoral students in general found the financial and reputational categories more important than master students.

(Scott, 2006) UK - Domestic Undergraduate Student Study including LTRS as an Information Source

In this discipline based study, Scott looked at the usage and importance of seven information sources among 191 first-year undergraduate bioscience students at four UK HEIs. In terms of usage, LTRS ranked 4th (52%). The other top factors were: HEI prospectus (93%), HEI visit (82%), HEI website (63%), and parents (40%). Students also rated the single most important factor in their final choice as: HEI visit (42%), HEI prospectus (27%), HEI website (11%), LTRS (9%), and teacher/careers advisor (7%). The study also noted that there was no significant difference in usage based on gender. However, the study did find strong differences in usage based on the selectivity of the HEI with 55% and 62% of the students attending the two more selective HEIs in the study reported using LTRS, compared to only 21% and 25% at the two less selective HEIs.

[32] The question related to LTRS asked students if they "Saw a list of ranking of universities."

(Shank and Beasley, 1998) US - Domestic Undergraduate Student Study

This survey of 183 students at a university in the US examined gender differences among undergraduate students in sources of information used and factors in choice of a HEI. Out of 20 choice factors, females rated 16 (10 statistically significant) of greater importance than males. Females also rated 8 of the 10 information sources as more important. While, only one of those differences was statistically significant, the overall trend suggested that female students at the HEI took into account a greater amount of information and placed a greater importance on a wider range of factors in their decision-making. However, it is worth noting that among the differences not found to be significant was university academic reputation.

(Shanka, Quintal and Taylor, 2005) Australia - International Undergraduate/Graduate Student Study

This research project asked 297 Asian students at a single university in Australia to select the most important factor for choosing the HEI among a list of six factors. The top three selected factors were: location (close to home) (24%), living costs (24%), and quality/variety of education offered (23%). However, the five sub-populations examined varied in the relative importance of the factors depending on country of origin. As an example, quality/variety of education offered was cited as the most important factor for 10% of the 52 Indonesian students, compared to 26% of the 95 Malaysian students.

(Shah and Laino, 2006) US - International Undergraduate/Graduate Student Study

This study found differences based on country of origin in the relative importance of 25 factors related to student education expectations among a survey of 295 prospective applicants to a US HEI from six Asian countries and Germany.

(Soo and Elliott, 2008) UK – International Undergraduate Study based on LTRS and Application Data

Soo and Elliot utilized UCAS application data to examine factors related to international (non-EU) undergraduate students applying between 2002 and 2007 to study business or engineering at 97 HEIs throughout the UK. Among the factors examined, was the role of institutional, as well as program rank, in league tables published in *The Times University Guide*. Their study showed a correlation (0.44) between higher institutional rank and the number of applications from international students. The authors also used regression analysis to better understand the nature of that relationship. After controlling for other quality indicators, the authors find that while the *Times* rank of the HEI is influential to both male and female business students, it is only influential to female engineering students. In addition, while both genders were influenced by program level rankings in business, neither male nor female engineering students were found to be so influenced. There was also variation within the business group based on gender; overall males placed more importance on both types of LTRS. However, female students were more influenced by HEI rank, while male students were more influenced by program rank.

(Soutar and Turner, 2002) Australia - Domestic Undergraduate Student Study

A study of 259 graduating high school students in Western Australia, found the five most important factors related to student choice of HEI to be: programs offered, academic

reputation, graduate employment prospects, teaching quality, and HEI atmosphere. Among their sample, the authors were unable to determine any sub-populations such as gender that differed significantly in the importance of the choice factors.

(Stiber, 2001; 2000) US - Domestic Graduate Student Study

In this pair of studies at a private HEI in Florida of master and doctoral business students were asked about the relative influence of various factors in their preference of HEI. The top five identified factors by doctoral students were: quality of professors, program offered, HEI accreditation, responsive professors, and HEI reputation. The top five factors for master's students were the same except that a convenient class schedule replaced HEI reputation.

(Teranishi et al., 2004) See (McDonough, 1997)

(UCAS, 2008) See (Purcell et al., 2008)

(UNITE, 2006a; UNITE, 2006b) UK - International/Domestic Undergraduate/Graduate Student Study including LTRS as a Choice Factor

In a pair of parallel studies, UNITE surveyed 1025 domestic and 357 international (both EU and non-EU) students studying at 20 HEIs in the UK on a variety of topics including academic factors related to their choice of a HEI. For domestic students surveyed, the following were the top factors (out of 8 examined): overall HEI reputation (48%), academic HEI reputation (45%), perceived teaching quality (35%), perceived quality of learning (27%), and league tables (20%). The top three factors for the international students were: academic HEI reputation (51%), perceived teaching quality (38%), and overall HEI reputation (37%). In contrast to other studies, the authors identified LTRS as less important to international students (16%) than domestic students.

(Veloutsou, Paton and Lewis, 2005) UK - Domestic Undergraduate Student Study including LTRS as an Information Source

This project surveyed 306 UK high school students about their level of use of 12 information sources (5-point Likert-type response format). LTRS placed 9th ($\bar{x}$ = 3.38) with the top sources being: HEI prospectus ($\bar{x}$ = 4.42), HEI visit ($\bar{x}$ = 4.21), HEI website ($\bar{x}$ = 4.08), friends ($\bar{x}$ = 3.69), and students at the HEI ($\bar{x}$ = 3.56). The authors did not find significant gender differences, but students with higher academic credentials were more likely to use LTRS.

(Webb, Coccari and Allen, 1996; Webb et al., 1997) US - Domestic Graduate Student Study

This study of 197 doctoral business students in the US examined 52 factors related to choice of a HEI. The top five choice factors identified were: program offered, academic reputation, degree marketability, contact time with professors, accreditations. They also noted that statistically significant differences were found among students attending public vs. private HEIs for 11 of the 52 factors. The authors conducted a different study a year later with a larger sample of 1285 graduates at seven HEIs. In that study, academic reputation was by far the highest rated of nine choice factors for students at each of the seven HEIs.

Appendix B: Relevant Questions from *CHE ExcellenceRanking* Student Survey

This appendix includes only the questions from the *CHE ExcellenceRanking* student surveys that were used in the analysis for this thesis. The online survey included branched questioning based upon respondent's selections to previous questions in the survey. Consequently, the number of each question varied. As a result, the relevant questions presented here are in the order they were given to respondents, but numbers are not included. Other intervening questions that were not relevant to this thesis are not included below. In some questions master and doctoral students were given different options as indicated below.

- Please choose the country of your university: (drop-down list)

- If you completed your higher education entrance qualification in a different country than you are studying in, you are considered to be an "international student".
  Are you an international student? Yes No

- Please choose your university. If you cannot choose your university here, please make sure that you chose your country on the previous page. (drop-down list)

- Please choose your discipline. If you are enrolled in an interdisciplinary study programme, please indicate the discipline that has the most weight in the programme. (drop-down list)

- (**Master)** Please give exact name of your study programme and the degree title granted (e.g. Masters of Science in ...):_____

- (**Doctoral**) Are you in an organised PhD programme? Yes No
  Please give us its type (organised PhD programme, école doctorale, Graduiertenkolleg...) and if possible its name:_____

- Which factors were important in choosing your university?

2007 Rating Scale

very important	important	rather important	rather unimportant	unimportant	very unimportant	I don't know
○	○	○	○	○	○	○

2009 Rating Scale

very important	important	somewhat important	somewhat unimportant	unimportant	very unimportant	N/A
○	○	○	○	○	○	○

Master Student Options

- o Subject-specific reasons (e.g. fields of study which can only be studied at your university or can be studied there particularly well)
- o Close distance to home town
- o Relatives / partner / friends at place of university
- o Attractive location of university
- o Good reputation of university and professors

- o Good ranking results
- o Language / country of university[33]
- o Other _____

Doctoral Student Options

- o Close distance to home town (2009 only)
- o Relatives / partner / friends at place of university
- o Attractive location of university
- o Good reputation of university and professors
- o Good ranking results
- o Language / country of university (2009 only)
- o Previously awarded Diploma or Masters degree here
- o Specialisation in research
- o Quality of research in the field
- o Quality of research at the university as a whole
- o Reputation of the supervisor
- o Previous contact to the supervisor
- o Other _____

Finally, we would like to ask you for some information about your personal background:

- Your Sex: Male Female
- Your age: (drop-down list) 19 or younger, one year increments until 49, 50 and older
- Please indicate your nationality: (text box) in 2007 (drop-down list) in 2009
- Please indicate, if you have a second or other nationality: _____ (2009 Only)
- Did you change universities in the course of your studies? Yes No
  If so, please state the university where you acquired your degree: _____
- If you completed your Bachelor degree (or equivalent) at a different university, please indicate: _____
- (**Doctoral**) If you completed your Master degree (or equivalent) at a different university, please indicate: _____
- If you were educated in other countries than that of you actual residence, please indicate:_
- Country in which you acquired your higher education entrance qualification:_____
- Country in which you acquired your Bachelor degree (or equivalent):_____
- (**Doctoral**) Country in which you acquired your Master degree (or equivalent):_____

[33] In the 2007 survey this factor had the preface "For international students:" However, some domestic student chose to rate the importance of the factor in their decision-making.

Appendix C: Student Respondents by Nationality

Table 32. 2007 Survey Respondents by Nationality

2007 Survey (biology, chemistry, math, and physics) Respondents by Nationality								
International Students from EU/EFTA			**International Students from other Nations**			**Domestic Students from EU/EFTA**		
(*n* = 266)	**Count**	**%**	**(*n* = 190)**	**Count**	**%**	**(*n* = 1380)**	**Count**	**%**
German	88	33.1%	Chinese	40	21.1%	German	602	43.6%
Italian	27	10.2%	Indian	22	11.6%	Swiss	197	14.3%
Greek	24	9.0%	Russian	16	8.4%	Dutch	179	13.0%
French	22	8.3%	Iranian	7	3.7%	Danish	117	8.5%
Polish	18	6.8%	Mexican	7	3.7%	British	114	8.3%
Spanish	15	5.6%	Turkish	7	3.7%	Italian	45	3.3%
Austrian	14	5.3%	American	6	3.2%	Norwegian	44	3.2%
British	6	2.3%	Ukrainian	6	3.2%	Swedish	39	2.8%
Luxembourger	6	2.3%	Canadian	5	2.6%	Spanish	28	2.0%
Bulgarian	5	1.9%	Brazilian	4	2.1%	Belgian	15	1.1%
Norwegian	5	1.9%	Colombian	4	2.1%			
Dutch	4	1.5%	Croatian	4	2.1%	**Other Nations Continued**		
Finnish	4	1.5%	Thai	4	2.1%	Bangladeshi	1	0.5%
Portuguese	4	1.5%	Argentinean	3	1.6%	Bolivian	1	0.5%
Romanian	4	1.5%	Australian	3	1.6%	Cameroonian	1	0.5%
Swedish	4	1.5%	Indonesian	3	1.6%	Costa Rican	1	0.5%
Belgian	3	1.1%	Malaysian	3	1.6%	Egyptian	1	0.5%
Swiss	3	1.1%	New Zealander	3	1.6%	Guyanese	1	0.5%
Estonian	2	0.8%	South Korean	3	1.6%	Japanese	1	0.5%
Lithuanian	2	0.8%	Taiwanese	3	1.6%	Nigerian	1	0.5%
Cypriot	1	0.4%	Albanian	2	1.1%	Omani	1	0.5%
Czech	1	0.4%	Chilean	2	1.1%	Peruvian	1	0.5%
Danish	1	0.4%	Ethiopian	2	1.1%	Saudi	1	0.5%
Hungarian	1	0.4%	Filipino	2	1.1%	Singaporean	1	0.5%
Slovakian	1	0.4%	Israeli	2	1.1%	South African	1	0.5%
Slovenian	1	0.4%	Kenyan	2	1.1%	Sri Lankan	1	0.5%
			Lebanese	2	1.1%	Surinamer	1	0.5%
			Pakistani	2	1.1%	Uruguayan	1	0.5%
			Venezuelan	2	1.1%	Vietnamese	1	0.5%
			Aruban	1	0.5%	Zimbabwean	1	0.5%

Table 33. 2009 Survey Respondents by Nationality

2009 Survey (economics, political science, and psychology) Respondents by Nationality								
International Students from EU/EFTA			**International Students from other Nations**			**Domestic Students from EU/EFTA**		
(*n* = 483)	**Count**	**%**	**(*n* = 291)**	**Count**	**%**	**(*n* = 2433)**	**Count**	**%**
German	179	37.1%	Chinese	39	13.4%	German	660	27.1%
Romanian	29	6.0%	American	28	9.6%	Dutch	548	22.5%
Italian	25	5.2%	Turkish	21	7.2%	Belgian	184	7.6%
Dutch	21	4.3%	Colombian	12	4.1%	Italian	176	7.2%
Greek	18	3.7%	Brazilian	11	3.8%	British	108	4.4%
Belgian	17	3.5%	Canadian	10	3.4%	French	107	4.4%
Bulgarian	16	3.3%	Indian	9	3.1%	Swiss	95	3.9%
French	15	3.1%	Mexican	9	3.1%	Swedish	82	3.4%
British	14	2.9%	Croatian	8	2.7%	Finnish	70	2.9%
Portuguese	13	2.7%	Russian	8	2.7%	Czech	69	2.8%
Spanish	13	2.7%	Indonesian	7	2.4%	Portuguese	69	2.8%
Austrian	12	2.5%	Nigerian	7	2.4%	Danish	59	2.4%
Polish	12	2.5%	Chilean	6	2.1%	Hungarian	56	2.3%
Slovakian	12	2.5%	Iranian	6	2.1%	Norwegian	35	1.4%
Irish	9	1.9%	Ukrainian	6	2.1%	Irish	34	1.4%
Swedish	9	1.9%	Vietnamese	6	2.1%	Austrian	28	1.2%
Norwegian	8	1.7%	Argentinean	5	1.7%	Polish	25	1.0%
Lithuanian	7	1.4%	Australian	5	1.7%	Estonian	15	0.6%
Czech	6	1.2%	Pakistani	4	1.4%	Spanish	13	0.5%
Danish	6	1.2%	Peruvian	4	1.4%			
Estonian	6	1.2%	South Korean	4	1.4%	**Other Nations Continued**		
Hungarian	6	1.2%	Taiwanese	4	1.4%	Afghan	1	0.3%
Swiss	6	1.2%	Thai	4	1.4%	Algerian	1	0.3%
Finnish	4	0.8%	Albanian	3	1.0%	Armenian	1	0.3%
Luxembourger	4	0.8%	Japanese	3	1.0%	Aruban	1	0.3%
Slovenian	4	0.8%	Senegalese	3	1.0%	Belarusian	1	0.3%
Icelander	3	0.6%	Bangladeshi	2	0.7%	Bosnian	1	0.3%
Latvian	3	0.6%	Bolivian	2	0.7%	Congolese (DR)	1	0.3%
Cypriot	2	0.4%	Bruneian	2	0.7%	Djibouti	1	0.3%
Liechtensteiner	2	0.4%	Cameroonian	2	0.7%	Ecuadorean	1	0.3%
Maltese	2	0.4%	Egyptian	2	0.7%	Ghanaian	1	0.3%
			Ethiopian	2	0.7%	Israeli	1	0.3%
			Georgian	2	0.7%	Kazakhstani	1	0.3%
			Jordanian	2	0.7%	Kenyan	1	0.3%
			Kyrgyz	2	0.7%	Macedonian	1	0.3%
			Lebanese	2	0.7%	Moldovan	1	0.3%
			Malaysian	2	0.7%	Montenegrin	1	0.3%
			Moroccan	2	0.7%	New Zealander	1	0.3%
			Netherlands Antilles	2	0.7%	Paraguayan	1	0.3%
			Serbian	2	0.7%	San Marinese	1	0.3%
			South African	2	0.7%	Saudi	1	0.3%
			Uruguayan	2	0.7%	Tanzanian	1	0.3%
			Uzbekistani	2	0.7%	Tunisian	1	0.3%
			Venezuelan	2	0.7%	Zimbabwean	1	0.3%

Appendix D: Respondents by Country of Study

Table 34. Sample by Country of Study

Country of Study	2007 Survey						2009 Survey					
	International Students from EU/EFTA (*n* = 266)		International Students from other Nations (*n* = 190)		Domestic Students from EU/EFTA (*n* = 1380)		International Students from EU/EFTA (*n* = 483)		International Students from other Nations (*n* = 291)		Domestic Students from EU/EFTA (*n* = 2433)	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Austria							7	1.4%	3	1.0%	27	1.1%
Belgium	1	0.4%	2	1.1%	15	1.1%	17	3.5%	7	2.4%	184	7.6%
Czech Republic							9	1.9%	1	0.3%	69	2.8%
Denmark	12	4.5%	4	2.1%	117	8.5%	6	1.2%	4	1.4%	59	2.4%
Estonia							1	0.2%			15	0.6%
Finland							12	2.5%	2	0.7%	70	2.9%
France							7	1.4%	27	9.3%	108	4.4%
Germany	32	12.0%	41	21.6%	601	43.6%	29	6.0%	29	10.0%	659	27.1%
Hungary							16	3.3%	9	3.1%	56	2.3%
Ireland							16	3.3%	16	5.5%	34	1.4%
Italy	1	0.4%	3	1.6%	45	3.3%	54	11.2%	13	4.5%	176	7.2%
Netherlands	50	18.8%	43	22.6%	179	13.0%	187	38.7%	70	24.1%	546	22.4%
Norway	2	0.8%	6	3.2%	44	3.2%	5	1.0%			35	1.4%
Poland									1	0.3%	25	1.0%
Portugal							3	0.6%	3	1.0%	69	2.8%
Spain	2	0.8%	2	1.1%	28	2.0%	18	3.7%	30	10.3%	13	0.5%
Sweden	12	4.5%	22	11.6%	39	2.8%	5	1.0%	10	3.4%	82	3.4%
Switzerland	115	43.2%	45	23.7%	198	14.3%	21	4.3%	2	0.7%	95	3.9%
United Kingdom	39	14.7%	22	11.6%	114	8.3%	66	13.7%	62	21.3%	108	4.4%
Not answered							4	0.8%	2	0.7%	3	0.1%

Appendix E: Detailed Binary Logistic Regression Results

Table 35: Detailed Binary Logistic Regression Results: 2007 Sample

Independent Variable (Reference Group)	*n*	B	S.E.	Wald	df	*p*	OR = Exp(B)	95% C.I. for Exp(B)	
Gender (Male)	247								
Female	178	0.130	0.278	0.218	1	.640	1.138	0.661	1.961
Age in years	425	-0.037	0.045	0.687	1	.407	0.963	0.882	1.052
Degree Level (Doctoral)	317								
Master	108	2.090	0.550	14.425	1	.000	8.083	2.749	23.764
Age x Degree Interaction	425	0.121	0.146	0.685	1	.408	1.129	0.847	1.503
Discipline (Math)	21			3.001	3	.391			
Biology	152	0.827	0.619	1.785	1	.182	2.285	0.680	7.684
Chemistry	159	0.808	0.607	1.772	1	.183	2.244	0.682	7.381
Physics	93	0.374	0.618	0.367	1	.545	1.454	0.433	4.879
Region (Western Europe)	214			32.859	7	.000			
Arab States	5	0.231	1.180	0.038	1	.845	1.259	0.125	12.721
Central and Eastern Europe	65	1.518	0.424	12.785	1	.000	4.562	1.985	10.482
East Asia and the Pacific	64	2.456	0.636	14.924	1	.000	11.658	3.353	40.530
Latin America and Caribbean	27	0.282	0.498	0.320	1	.571	1.325	0.500	3.515
North America	10	0.918	0.872	1.110	1	.292	2.505	0.454	13.827
Central, South and West Asia	32	2.328	0.774	9.048	1	.003	10.258	2.250	46.760
Sub-Saharan Africa	8	1.934	1.141	2.872	1	.090	6.914	0.739	64.705
Country of Study (UK)	59			14.417	4	.006			
Germany	65	-1.613	0.595	7.358	1	.007	0.199	0.062	0.639
Netherlands	84	-2.210	0.605	13.353	1	.000	0.110	0.034	0.359
Switzerland	152	-1.307	0.550	5.644	1	.018	0.271	0.092	0.796
Other	65	-1.566	0.662	5.596	1	.018	0.209	0.057	0.765
Constant		0.979	0.776	1.594	1	.207	2.663		
Other = Belgium (n = 3), Denmark (n = 12), Italy (n = 4), Norway (n = 8), Spain (n = 4), and Sweden (n = 34) Pseudo R^2: Cox & Snell = 0.183, Nagelkerke = 0.276. Hosmer and Lemeshow Test: $x^2(8) = 5.938$, $p = .654$									

Table 36: Detailed Binary Logistic Regression Results: 2009 Sample

Independent Variable (Reference Group)	*n*	B	S.E.	Wald	df	*p*	OR = Exp(B)	95% C.I. for Exp(B)	
Gender (Male)	361								
Female	379	-0.137	0.272	0.255	1	.613	0.872	0.512	1.485
Age in years	740	-0.073	0.048	2.282	1	.131	0.929	0.845	1.022
Degree Level (Doctoral)	296								
Master	444	0.026	0.328	0.006	1	.936	1.027	0.540	1.952
Age x Degree Interaction	740	0.038	0.063	0.368	1	.544	1.039	0.918	1.176
Discipline (Political Science)	199			5.950	2	.051			
Economics	386	0.894	0.403	4.911	1	.027	2.445	1.109	5.392
Psychology	155	0.276	0.444	0.385	1	.535	1.318	0.551	3.148
Region (Western Europe)	367			6.913	7	.438			
Arab States	12	-0.175	1.137	0.024	1	.878	0.840	0.090	7.800
Central and Eastern Europe	146	0.921	0.445	4.291	1	.038	2.512	1.051	6.005
East Asia and the Pacific	74	0.953	0.646	2.175	1	.140	2.594	0.731	9.208
Latin America and Caribbean	56	0.709	0.584	1.474	1	.225	2.031	0.647	6.375
North America	37	0.192	0.558	0.119	1	.731	1.212	0.406	3.617
Central, South and West Asia	29	0.383	0.789	0.235	1	.628	1.466	0.312	6.886
Sub-Saharan Africa	19	0.471	1.097	0.184	1	.668	1.602	0.187	13.737
Country of Study (UK)	126			16.567	10	.085			
Belgium	24	-1.894	1.054	3.229	1	.072	0.150	0.019	1.188
France	31	-1.972	1.081	3.327	1	.068	0.139	0.017	1.158
Germany	54	-2.240	0.854	6.882	1	.009	0.106	0.020	0.568
Hungary	25	-2.596	1.041	6.224	1	.013	0.075	0.010	0.573
Italy	64	-1.610	0.860	3.503	1	.061	0.200	0.037	1.079
Ireland	30	-1.900	0.965	3.878	1	.049	0.150	0.023	0.991
Netherlands	245	-2.286	0.781	8.559	1	.003	0.102	0.022	0.470
Spain	48	-2.831	0.867	10.669	1	.001	0.059	0.011	0.322
Switzerland	22	-3.011	0.945	10.148	1	.001	0.049	0.008	0.314
Other	71	-2.708	0.807	11.271	1	.001	0.067	0.014	0.324
Constant		3.682	0.799	21.219	1	.000	39.709		

Other = Austria (*n* = 10), Czech Republic (*n* = 10), Denmark (*n* = 10), Estonia (*n* = 1), Finland (*n* = 14), Norway (*n* = 5), Poland (*n* = 1), Portugal (*n* = 5), and Sweden (*n* = 15)
Pseudo R^2: Cox & Snell = 0.056, Nagelkerke = 0.119. Hosmer and Lemeshow Test: $x^2(8) = 17.785$, $p = .026$