

Tracking Study Abroad Outcomes: A Longitudinal Curriculum Vitae Analysis of  
Global Engagements in Research in Higher Education

Wilson Eduan

UCL

Thesis Presented for the Award of Degree of Doctor of Philosophy

I, Wilson Eduan confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

## Abstract

Nations seeking to build world class universities need globally competent academic faculty, particularly in relation to research. The study acknowledges global inequalities in higher education among countries, and recognizes that one important way for disadvantaged countries to build capacity is to send faculty abroad for doctoral study. This research project investigated the links between the study abroad experience, and levels and forms of global engagement in research following students return to the country of origin and proposes a longitudinal curriculum vitae analysis method for the similar purposes.

The investigation was conducted in relation to faculty from Uganda. The following research questions were addressed. (1) Do foreign PhD holders become more globally engaged in research following return to country of origin? (2) Do foreign PhD holders become more globally engaged in specific research dimensions following return to country of origin? (3) To what extent are study abroad factors associated with changes in global engagement in research dimensions for higher education faculty? (4) To what degree do associated outcomes of a foreign doctorate (if any) endure in global research engagements across generations of study abroad? The method of empirical inquiry was a Longitudinal Curriculum Vitae Analysis (LCVA) using faculty Curriculum Vitae (CV) data. The CVs of doctoral graduate faculty working in higher education in Uganda were drawn from the archives of the Uganda National Council for Higher Education. The LCVA method covered the six-year period between 2009 and 2014. Using the Generalized Estimating Equation method, rates of global engagements in research for foreign and domestic doctorates were compared and associated factors were assessed.

The research found that study abroad graduates were more globally engaged than domestic graduates but with variations by gender, academic discipline, rank and education. Outcomes were partly attributed to study duration, study destination, and the intensity of the experience but also demographics. Foreign doctoral graduates stood out more in accessing international funding than in other research activity dimensions. Positive results from study abroad were more visible among early career cohorts than older cohorts, suggesting that study abroad outcomes had limited durability. The results suggest mechanisms for improving study abroad outcomes.

Keywords: Study abroad outcomes, global engagement, Internationalisation, LCVA method, Higher Education Research

## Table of Contents

Abstract .....	2
Table of Tables .....	6
Table of Figures .....	7
Chapter 1 : Introduction .....	8
1.1. Introduction .....	8
1.2. Rationale for the study.....	8
1.3. Background context of study abroad outcomes .....	10
1.4. Perspectives on study abroad outcomes .....	13
1.5. Gaps in literature and purpose of the study .....	14
1.6. Significance of the study.....	15
1.7. Study outline .....	17
Chapter 2 : Review of Literature .....	20
2.1. Introduction .....	20
2.2. Features of study abroad.....	20
2.3. Forms of global engagement .....	24
2.4. Interrelatedness among research specific research dimensions.....	36
2.5. The Global Higher Education Research system .....	44
2.6. Uganda Higher Education Research Context .....	47
2.7. Study abroad and its outcomes .....	52
2.8. Study abroad factors and global engagement .....	65
2.9. Durability of outcomes across generations .....	80
2.10. Limitations in literature.....	82
2.11. Conclusions.....	84
Chapter 3 : Research Methodology .....	86
3.1. Introduction .....	86
3.2. The Theoretical framework.....	86
3.3. The adjusted model.....	89
3.4. Methodology.....	91
3.5. Longitudinal Curriculum Vitae Analysis (LCVA) Method .....	96
3.6. Study design .....	99
3.7. Sample selection and Access.....	101
3.8. Measurement and Coding .....	102
3.9. Validity and Measurement .....	108
3.10. Reliability and Measurement .....	110
3.11. Ethical Implications.....	112

3.12. Study timetable .....	113
3.13. Conclusions.....	114
Chapter 4 : Data characteristics and Analysis.....	115
4.1 Introduction .....	115
4.2. Sample Characteristics by award type.....	115
4.3. Sample characteristics by age and experience.....	119
4.4. Data characteristics for predictor variables .....	120
4.5. Characteristics of the outcome measures.....	123
4.6. Correlational Analysis.....	131
4.7. Missing Values .....	132
4.8. Data Analysis .....	134
4.9. Conclusions.....	137
Chapter 5 : Overall study abroad experience and global research engagement .....	139
5.1. Introduction .....	139
5.2. The GEE analysis Process.....	139
5.3. Results of the GEE Analysis.....	141
5.4. Study abroad and global engagement across education level .....	143
5.5. Study abroad and global engagement across gender categories .....	145
5.6. Study abroad and global engagement across academic ranks .....	148
5.7. Study abroad and global engagement across discipline categories.....	150
5.8. Discussion.....	153
5.9. Conclusions.....	159
Chapter 6 : Study Abroad Outcomes Across forms of Research Engagement.....	160
6.1. Introduction .....	160
6.2. Descriptive Statistics .....	160
6.3. GEE Analysis procedure .....	161
6.4. Results of GEE analysis across forms of engagement .....	163
6.5. Examining global engagement across education levels.....	174
6.6. Descriptive Statistics .....	174
6.7. Results of the GEE analysis across education levels .....	175
6.8. Examining global engagement across academic disciplines.....	185
6.9. Descriptive statistics.....	185
6.10. Results of GEE analysis across disciplines .....	186
6.11. Examining global engagement across academic ranks .....	196
6.12. Descriptive statistics.....	196
6.13. Results of GEE analysis across academic ranks.....	197

6.14.	Analysis for study abroad outcomes on across gender .....	207
6.15.	Descriptive statistics .....	207
6.16.	Results of the GEE Analysis of outcomes across gender .....	208
6.17.	Summary of results for the Chapter .....	219
6.18.	Discussion.....	222
6.19.	Conclusions.....	234
Chapter 7 : Study Abroad Factors and Specific Forms of Research Engagement .....		236
7.1.	Introduction .....	236
7.2.	GEE analysis procedure.....	236
7.3.	Results of the GEE analysis .....	238
7.4.	Study abroad factors and global engagement across disciplines .....	246
7.5.	Results of the GEE analysis .....	246
7.6.	Study abroad factors and global engagement across gender categories .....	258
7.7.	Results of the GEE analysis .....	258
7.8.	Chapter Summary .....	269
7.9.	Discussion.....	271
7.10.	Conclusions.....	277
Chapter 8 : Endurance of Global Research Engagement across Generations.....		279
8.1.	Introduction .....	279
8.2.	Sample characteristics .....	280
8.3.	Descriptive Statistics .....	282
8.4.	GEE analysis procedure.....	283
8.5.	Results of GEE Analysis.....	285
8.6.	Chapter results in summary .....	308
8.8.	Discussion.....	312
8.9.	Conclusions.....	317
Chapter 9 : Summary, Implications, and Limitations .....		319
9.1.	Introduction .....	319
9.2.	Study abroad outcomes on global engagement in research .....	319
9.3.	Study abroad outcomes across specific forms of research engagement .....	321
9.4.	Study abroad factors association with global research engagements .....	326
9.5.	Endurance of outcomes across generations.....	333
9.6.	Implications of the study for policy and practice.....	335
9.7.	Limitations of LCVA method .....	346
9.8.	Study limitations and recommendations .....	349
9.9.	Conclusions.....	353

References: .....	356
Appendices .....	369
Appendix 1: The Coding Manual .....	369
Appendix 2: The Coding Schedule .....	370
Appendix 3: Access Letter to National Council for Higher Education.....	371

### Table of Tables

Table 4.1 Number of CVs by faculty characteristics and degree award (n=170) .....	116
Table 4.2: Observations by sample characteristics and degree award (N = 795).....	117
Table 4.3 Sample characteristics by mean age and experience (N = 795).....	120
Table 4.4 Summary statistics table for numeric variables (N=795). .....	123
Table 4.5 Table showing correlations among study variables. ....	132
Table 5.1: GEE table for study abroad outcomes on global engagement (N=795).....	142
Table 5.2: Descriptive statistics for outcomes across education level (N=795). ....	143
Table 5.3: GEE table for outcomes across education levels (N=795) .....	145
Table 5.4: Descriptive statistics for engagements across gender categories (N=795) .	146
Table 5.5: GEE table for outcomes across gender (N=795).....	148
Table 5.6: Descriptive statistics for engagements across academic ranks (N=795) .....	149
Table 5.7: GEE table for outcomes across academic ranks (N=795) .....	150
Table 5.8: Descriptive table for engagements across academic disciplines (N=795). ..	151
Table 5.9: GEE table for outcomes across academic disciplines (N=795) .....	153
Table 6.1 Descriptive statistics of engagement outcomes by doctoral award (N=795) .	161
Table 6.2: GEE table for global engagement across research dimensions (N=795) ....	173
Table 6.3: Descriptive table for engagements across education by award (N=795) .....	175
Table 6.4 GEE table for outcomes across education levels (N=795) .....	184
Table 6.5: Descriptive statistics for outcomes across academic disciplines (N=795). ..	186
Table 6.6: GEE table for outcomes across disciplines (N=795). ....	195
Table 6.7: Descriptive results of outcomes across academic ranks by award (N=795)	197
Table 6.8: GEE table for outcomes across academic ranks (N=795). ....	206
Table 6.9: Descriptive table for engagements across gender by award (N=795). ....	208
Table 6.10: GEE table for engagement outcomes across gender categories (N=795) .	218
Table 7.1: GEE table for impact of study abroad factors (N=795). ....	245

Table 7.2: GEE table of impact of study Abroad factors across disciplines (N=795) ....	257
Table 7.3: GEE table for impact of study abroad factors across gender (N=795).....	268
Table 8.1: Cohort sub-sample observation frequencies across demographics.....	281
Table 8.2: Summary of mean global engagement outcomes by cohort (N=795).....	282
Table 8.3: GEE table for publication rates across graduate cohorts (N=795).....	289
Table 8.4: GEE table for funding rates across graduate cohorts (N=795) .....	292
Table 8.5: GEE table for collaboration rates across graduate cohorts (N=795).....	296
Table 8.6: GEE table for Affiliations rates across graduate cohorts (N=795).....	300
Table 8.7: GEE table of results for project rates across graduate cohorts (N=795).....	304
Table 8.8: GEE table for international conference rates across cohorts (N=795) .....	308
Table 9.1: Statistical power analysis table .....	351

### **Table of Figures**

Figure 3.1: The conceptual model for outcomes of study abroad in global research.....	91
Figure 4.1: Histogram of frequency of international affiliations.....	124
Figure 4.2: Histogram of frequency of international collaboration .....	125
Figure 4.3: Histogram of frequency of access to international funding.....	126
Figure 4.4: Histogram of frequency of participation in international projects .....	127
Figure 4.5: Histogram of International journal publications .....	129
Figure 4.6: Histogram of frequency of international conference presentations.....	130
Figure 4.7: Histogram of frequency of global engagements in research.....	131

## **Chapter 1 : Introduction**

### **1.1. Introduction**

This chapter serves as an introductory chapter for a study that sought to examine the extent to which study abroad affects global engagement for research faculty in higher education following return to countries of origin. The introduction explains the rationale of the study, the purpose and later the significance of the study before the detailed study outline at the end of the chapter.

### **1.2. Rationale for the study**

The status of a world class university is taking a prominent position for many higher education institutions globally (Shin & Kehm 2012). Nations and higher education institutions in low income countries aim to attract foreign trained doctorates for faculty jobs. Institutions unable to attract such globally competitive faculty send their faculty for study abroad with a view of improving their international competitiveness. As the approach becomes more and more popular, its transformative capacity is also coming under closer scrutiny. Motivations for examining study abroad outcomes often range from assessment of perceived benefits (Cubillos, Chieffo, & Fan 2008), Wiers-Jenssen & Try 2005) and other motivations are in response to demands for accountability (Doyle 2007). To fund doctoral study abroad in financially constrained economies, institutions need to go beyond existing evidence for study abroad and demonstrate the competitive advantage in global engagement in research to justify their calls for study abroad.



Higher education administrators, marketers and funders have little evidence to support doctoral funding abroad. The present study extends related literature on global engagement outcomes of study abroad (Murphy, Sahakyan & Yong-Yi 2014, Paige, Fry, Stallman, Elizabeth, & Jasmina 2009) and places it to the context of higher education research by faculty.

Research in higher education has become important today due to global competition at the level of nations and institutions. In the global ranking of universities, higher education research has become one of the benchmarks in assessing global competitiveness of universities. The introduction of the world university rankings has added to increasing competition not only among institutions but even among individual researchers (Marginson & Van der Wende 2007). Institutional rankings depend partly on research performances at an individual level. For instance in Uganda, universities are urged to compete in global rankings and as a consequence faculty are called upon to be globally competitive. Annually, the Uganda National Council for Higher Education (UNCHE) requires faculty to submit research engagements for evaluation on research performance. In response, universities continue to appeal for increased funding for capacity building and research in addition to sourcing international partnerships and donor support to facilitate faculty access to research training abroad. For low income countries, the study abroad approach to capacity building is consistent with Ben-David arguments that global science is the national science of the world's science centers (cited in Kyvik and Larsen 1994) and that small countries could avoid mediocrity by attaching themselves to the global centers of science (Stolte-

Heiskanen cited in Kyvik and Larsen 1994). Global engagement in research therefore, remains vital in such countries.

Doctoral training abroad has been ongoing for decades and has partly been instrumental in developing the current research capacity in low-income countries. Even in recent years, some faculty still receive doctoral studies in various countries. For Uganda, the main destinations include; South Africa, United States, United Kingdom and Scandinavia. Despite the long history of study abroad, students from the world's global centers have remained among the most predominantly mobile category than those in low-income countries. Part of the reason for the low enrolments for many countries attributed to difficulties of advocating for study abroad arising from the lack of specific validating information regarding gains and future benefits especially within professional disciplines (Shaftel, Shaftel, Timothy, Ahluwalia & Rohini 2007). With the current push for global competitiveness, the need for supporting evidence for decision making for governments, funders, and potential students decision making is more than needed. Therefore, studies are necessary to provide validating information on the current push to boost competitiveness through study abroad and especially within professional contexts of higher education.

### **1.3. Background context of study abroad outcomes**

Interest in study abroad outcomes postulates a broad empirical space. It could involve high, middle and low-income countries. In countries such as the UK, study abroad is viewed in terms of getting a second chance at success when students

miss access to Oxbridge status universities at home and opt for similar status universities abroad (Brooks & Waters 2009). Within the European Union, it has become part of the internationalisation of European research. For the US, study abroad could be characterized as part of the globalization of citizens to cope within a competitive world (Paige et al 2009), while in China finds benefits in skills transfer by researchers abroad in the process of brain circulation (Jonkers and Tijssen, 2008). Aspirations for study abroad certainly differ by country or region.

In low-income countries, interest in study abroad is still growing. Low-income countries according to World Bank classification are mainly in Sub-Saharan Africa and include; the Democratic Republic of the Congo, Benin, Burkina Faso, Burundi, Central African Republic, Chad, Comoros, Eritrea, Ethiopia, Gambia, Guinea, and Guinea-Bissau. Others are; Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Myanmar, Nepal, Niger, Rwanda, Sierra Leone, Somalia, Togo, Uganda, the United Republic of Tanzania, Zimbabwe, Haiti, Tajikistan, and Bangladesh. Only the last three are not part of Sub-Saharan Africa. Aware of educational funding constraints faced by institutions in such countries, it is therefore important to focus more on the African context to evaluate change resulting from study abroad.

Study abroad is no new phenomenon even in low-income countries but with little known about outcomes. Historically, study abroad is one key mechanism for capacity building especially during the colonial and cold war era. The benefits to nation states have nevertheless been achieved amidst challenges. Maringe &

Carter (2007), highlights that studying abroad particularly for African students faces; the fear of missed opportunities back home, enormous direct costs, failure to meet study costs and family disruption. Other factors include; low quality of educational experience for children, difficulties integrating into the socio-cultural fabric, erosion of home cultural capital, Visa restrictions, and frequent changes. In recent times, study abroad is perceived as way of providing graduates with international experience and make them globally competitive. Unfortunately there is little compelling evidence on study abroad outcomes for a call to increased participation specifically for low-income countries.

Study abroad returnees are expected to transform research in institutions of countries of origin. However, there is need to acknowledge that research practice in most of the low-income countries remains problematic and supported by comparatively less competitive funding. For example, a comparison of World Bank statistics data on funding involving small and high-income countries shows reveals a huge funding disparity. Uganda spent 0.56% of GDP on research and development in 2010. This percentage is quite small compared to countries using higher rates of GDP such as China 1.76%, UK 1.77%, Singapore 2.05%, and Korea 3.74% for the same year. Moreover, the available funding is provided only to public institutions. Universities are further expected to seek alternative sources of financing to facilitate activities including research. With inadequate funds for purchases of materials, supplies, and research and design (R&D) equipment such as utilities, reference materials, subscriptions to libraries besides scientific societies, and lab materials, the effect is noticeable in the output. Comparing the

research outputs for the same period 2010; Uganda's production for indexed journals was 154 published journal papers; China 79,991; UK 45,978; Singapore 4,377 and Korea 24,106. Considering the enormous funding disparities, Uganda, and many other low-income countries need more than double the effort. Moreover, the strategy for capacity building approach preferred by higher education institutions also needs evidence to justify costs or convince funders.

#### **1.4. Perspectives on study abroad outcomes**

Research on outcomes of study abroad has remained an attractive topic in research for decades and literature is immense. Sections of the early literature were more concerned about the perceived drawbacks of study abroad especially brain drain and waste (Beine, Docquier & Rapoport 2008, Oosterbeek & Webbink 2011) while others on the positive aspects such as brain circulation (Jonkers and Tijssen, 2008). Among other considerations of interest was the significant role of study abroad in enhancing foreign language competence (Kang 2014, Llanes 2011, Savicki 2011, Shaftel, Shaftel & Ahluwalia 2007). More research is often linked with intercultural sensitivity associated with study abroad experience (Bender 2009, Deardoff 2006, Doyle 2009, Fuller 2007, Rexeisen et al. 2008, Salisbury, et al. 2013). On the other hand, others attempt to deal with methodological issues in addressing study abroad outcomes (Hadis 2005).

While examining long-term results, researchers want to know how study abroad affects on career progression in general terms (Bachner 2009, Mahajeri & Gillespie 2008, Orahod et al. 2004, Wiers-Jenssen 2007). More recent studies go further

to examine study abroad as a tool for global engagement and discover how it unfolds in the social life of returnees (Murphy, Sahakyan & Yong-Yi, 2014). Despite the immense research output, literature is far from exhaustive especially considering the professional diversity of international students. As part of an exploration into professional areas, studies are needed to connect ongoing discourses on study abroad outcomes into the context of research profession research activity in higher education.

### **1.5. Gaps in literature and purpose of the study**

A typical response to evaluating long-term outcomes of study abroad has often been through cross-sectional surveys of participants and non-participants of study abroad to compare results and demonstrate the potential gains in participation and or loss incurred by missing out on study abroad. In keeping with this tradition, the current study extends discourses on the relationship between study abroad and global engagement to new contexts but with a difference. The study engages with the concept of “global engagement” within the context of research as a specialized form of engagement and higher education faculty research as an empirical field of professional practice. It focuses on doctoral graduates serving as university faculty as a population of interest as opposed to the focus on undergraduates in previous studies. It takes into account existing limitations in research methods for study abroad outcomes and proposes a new method involving Longitudinal Curriculum Vitae Analysis (LCVA) instead of cross-sectional surveys. The study site is a low-income country as opposed to studies conducted in high-income countries.

Through innovative approaches, the study contributes not only to literature on study abroad outcomes but builds on research methodology in respect of study abroad outcomes. The study therefore has a twin purpose of examining changes in global engagements in higher education research as an outcome of doctoral study abroad for returnee graduates as well as proposing and exploring the use of LCVA method in examining study abroad outcomes.

The main focus research question: To what extent does a doctorate abroad affect global engagement in research for higher education faculty following the return to the country of origin? It was followed up with specific research questions: Do foreign Ph.D. holders become more globally engaged in research dimensions than domestic doctorates years following graduation? To what extent do specific study abroad factors affect changes in rates of global engagement in research dimensions for higher education faculty? To what degree does impact of a foreign doctorate (if any) endure in global research engagement dimensions for the diverse generations of study abroad following the return to the country of origin? By focusing on these questions, the study builds on emerging discourses relating study abroad experiences with a view of providing evidence for institutional administrators, funding agencies and marketers interested in increasing study abroad enrolments.

### **1.6. Significance of the study**

Amidst ongoing massification and competition in higher education globally, the need to recruit competent research faculty is becoming an important aspect for

higher education managers and government policy makers. Policy makers in government especially in developing countries want to boost research capacity in their countries and depend on their graduates to further global engagement. The study might assist in the development of strategy and ways of maximizing the benefits from study abroad. On the other hand, higher education institutions employing study abroad graduates, it becomes possible to set priorities in training and positioning of such graduates. Moreover, institutions training graduates would be in a better position to identify training needs for graduates with a view of making it more productive to the graduate and the employing institution.

Accountability is required by higher education sponsors in particular by student sending countries. Sponsors need to know the worth of sponsoring students abroad and more especially for higher degrees associated with increasing costs. For low-income countries, expenses on education abroad other than in domestic institutions need to be well justified regarding returns to the country and institutional ranking. On the other hand, aware of the increasing low response rates to surveys, the innovative approach to research methods used in this study could be useful in future studies on study abroad outcomes. Higher education institutions maintain records of CVs for faculty and are therefore better positioned to assess faculty continuously on research performance. It is, therefore, an alternative approach to overcoming many challenges faced by researchers. Documentary study minimizes reactivity effects and non-response bias common to surveys. The use of longitudinal data could mitigate some of the statistical problems associated with missing data in analysis of cross-sectional data.



## **1.7. Study outline**

The structure of the thesis consists of nine chapters and the contents of each are elaborated below;

### Chapter 1: Introduction

The chapter elaborates the rationale of the study and seeks its justification through literature and empirical conditions. Furthermore, the chapter contains; the purpose statement of the research, the potential contribution, the questions addressed, and the study outline.

### Chapter 2: Review of the literature

The chapter reviews, the theoretical framework of the key concepts relating to study abroad and global engagement. It also explores global and Uganda contexts of higher education system, the outcomes of study abroad and specific relationships between study abroad and global engagement. It foreshadows suggestions for the importance of extending current literature on study abroad for global engagement into specific and more competitive areas, especially in research.

### Chapter 3: Methodology and Methods

The third chapter discusses the methodological challenges about studies on study abroad outcomes and proposes the LCVA method as an attempt to overcome some of the problems in previous studies. It also presents the selected model of

study abroad for global engagement and sample selection issues, measurement and coding process and how the study addressed validity and reliability.

#### Chapter 4: Sample and data Characteristics

The chapter on data characteristics is special in providing space for assessment of data characteristics to enable selection of appropriate analytical techniques suitable in answering the research questions. It consists of checking the summary statistics and assessing sample characteristics for foreign doctorates and domestic doctorates to determine whether the two groups are comparable. In addition, each outcome measure was also examined to determine the nature of the distribution and then followed by a correlational analysis to assess multicollinearity.

#### Chapter 5: Study abroad and global engagement outcomes in research

The chapter examines overall outcomes on global engagement in research when all the dimensions of research are merged. It seeks to answer the core question whether study abroad affects outcomes on global research involvement. It also examines whether the outcomes are the same across demographic characteristics including; education, gender, academic disciplines and academic ranks.

#### Chapter 6: Study abroad outcomes for specific research dimensions

The chapter aims at determining examines the outcomes of study abroad for specific dimensions of research engagement by comparing foreign and domestic doctoral graduate performance on global engagement in research. The

comparison is made to test the assumption that foreign doctorates would be expected to have higher levels of global engagements than domestic doctorates across all the dimensions research. The chapter also examined across education, gender, academic disciplines and academic rank categories to determine whether outcomes were same.

#### Chapter 7: Specific factors affecting global engagements in research:

The aim of the chapter was to determine specific study abroad factors associated with changes in the level of global engagement for each research dimension. The goal was to identify the factors which contribute to the changes in study abroad outcomes for higher education faculty research.

#### Chapter 8: Durability of study abroad outcomes across generations

The chapter examined the sustainability of the results across generations by making group comparisons. It compares three cohorts created during the analysis. The three cohorts consist of faculty with five years following Ph.D., ten years after Ph.D. and the third cohort for those having more than a decade after Ph.D.

#### Chapter 9: Summary, Implications, limitations and conclusions

The last chapter of the study is a summary of results presented with their impact on practice. The chapter also addresses methodological limitations of the proposed LCVA method as well as the limitations of the substantive topic and concludes with suggestions for further study.

## **Chapter 2 : Review of Literature**

### **2.1. Introduction**

This chapter reviews the literature on the relationship between study abroad and global engagement in research following student return to the country of origin. Cognizant of the paucity of research specific to study abroad outcomes on research, the review was expanded to cover a wider scope of study abroad outcomes. The review begins with theoretical framework focusing on conceptions of study abroad as well as the theoretical conceptions of global engagement. The review then explores the global contexts and followed by the Uganda contexts of higher education research. In later sections it discusses the results of study abroad are discussed to foreshadow subsequent discussions on the impact of specific study abroad factors on global engagement. In the last section, the review focuses on the durability of study abroad outcomes before concluding with limitations in the literature.

### **2.2. Features of study abroad**

Over the years, study abroad has been conceptualized in different ways and concepts have kept on changing along with emerging approaches to study abroad. Early studies defining study abroad utilized concepts of duration, academic content, and degree of immersion (depth) in the host culture (Norris & Dwyer 1997). New conceptions have since emerged and constructs increased from three to seven components. The aspects cover; duration, language competence of

participants, the extent to which target language is used in coursework on site, context of academic work, and type of housing arrangements. Other aspects include; provisions for guided cultural/experiential learning and structured opportunities for students to reflect on their cultural experiences (Engle and Engle 2003, Fuller 2007). The last definition adds emphasis to the concept of immersion/depth of the experience and still echoed in subsequent conceptions of study abroad. More recently, however, Paige et al. (2009) in conceptualizing a global engagement model came up with duration, depth, destination and demographics as the core four concepts underlying study abroad experience. The definition by is more current and encompasses concepts used in previous studies.

Depth for Paige et al. (2009), consists of a six indicator index. The indicators include; studied and worked abroad, studied abroad in more than one destination, direct enrollment in the overseas institution and took courses alongside host nationals, had work internship, or field research experience as part of their study abroad, and more than one study abroad experience as an undergraduate. Although prior authors did not use the depth index, they nevertheless employed concepts related to those in the development of the depth index. The concepts range from duration, entry language competence of participants, the use of target language in coursework, and context of academic work. Others are the type of housing arrangements, provisions for guided cultural/experiential learning, and structured opportunities for students to reflect on their cultural experiences in evaluating outcomes (Engle and Engle 2003, Fuller 2007). It is evident that the

same issues still dominate the understanding of study abroad experiences and particularly in considering its implications for participants.

Duration is used to refer to the time spent abroad and often measured as the number of months spent abroad. For doctoral courses, variations exist by country. For instance, in the US it is five years, the UK three to four years and other countries have their durations. The challenge faced in the definition is that graduates who spend a longer period for other reasons other than academic duration of the course shall easily be analyzed as though they were on a longer program than their colleagues on the same program. On the other hand, countries with different years for the same program are bound to produce two types of participants. For instance, University College London Institute of Education has the Ph.D. program of three years and the integrated program is four years. Duration abroad will produce two different programs but in reality, the training program is the same. It might, therefore, present challenges in discriminating outcomes in terms of time spent abroad in measurement. Therefore, measuring the duration of the course is bound to be problematic but the time difference spent abroad is still important. When measuring duration, it is useful to pay attention to the difficulties presented by the nature of measurement.

Destination index is original to SAGE (Paige et al. 2009). It is an index created with the purpose of having a multifaceted variable that would distinguish various study abroad destinations. Together with the Human Development Index (HDI), the destination index involves three constructs: cultural similarity-dissimilarity, cultural

distance based on Hofstede's four cultural dimensions of power distance, uncertainty avoidance, individualism-collectivism, and masculinity-femininity. The measures are subjective and could easily be affected by participant reactivity effects. Besides, the definition predetermines the methods of data collection, and this can present challenges when seeking to identify the locations without contacting the alumni. Despite its challenges, it has the advantage of HDI as an independent measure, and this can be reinforced with research intensity index to determine the destination.

Demographic factors and global engagement outcomes are associated. Paige and his colleagues identify demographics to include age at study abroad, gender and ethnicity and acknowledge their role in influencing global engagement outcomes (Paige et al. 2009). Although Paige et al. use demographic factors, as a variable of interest, in other studies, demographics are control variables in the analysis. The analysis, however, leaves out a significant number of demographic variables that could potentially affect outcomes. Rosterd & Arknes (2014), in addition to age, gender, and ethnicity, also included experience and type of academic discipline in their study. These studies provide a useful characterization of potential demographic factors likely to have an influence on global engagement outcomes. Moreover, in as far as higher education faculty is a concern, the academic discipline, the postdoc research experience and academic rank are key demographics of higher education.

### **2.3. Forms of global engagement**

Studies on the concept of global engagement have no specific definition outside its context. The idea of global engagement as conceptualized by Paige et al. (2009) refers to “a post-study abroad set of multidimensional behaviors organized into five distinct categories including; civic engagement, philanthropy, knowledge production, social entrepreneurship, and voluntary simplicity (an environmentally conscious lifestyle)”. These are by far general categories that appeal to no professional context. Despite the contextualized detail, global engagement was used to refer to transferable values across national borders.

In the research domain, ‘Internationalisation of research’ could be linked to the idea of global engagement. Other scholars define ‘Internationalization’ regarding a process of “becoming international” or more international (Wendt, Slipersæter & Aksnes, 2003). In general, then, internationalization implies that the borders of nation-states are increasingly bypassed, become, less vital politically, culturally and economically, and becomes less necessary for the energies, activities, interests, and loyalties of researchers, students, universities, research institutes and companies.

Internationalization may be conceptualized at different levels and with similar implications for global engagement. Internationalization is conceptualized at macro, meso and micro levels (Trondal, Gornitzka & Gulbrandsen 2003). The macro level is the place of the long-term planning and execution of policies for research and innovations in education. The mesolevel includes activities of



companies, research institutes and institutions of higher learning like membership in international networks and bilateral or multilateral co-operative ventures. The lowest level is the micro level focusing on such issues as an individual student and staff mobility and their motivations, individual networks and labor market outcomes. While most research tends to focus at the macro level, the study examines global engagement at the micro-level analysis.

Internationalisation in research can be manifested in various forms. Kyvik & Larsen (1994) in their study assessing international contact and research performance measured publications in terms of articles in research books, textbooks and conference proceedings, research books and textbooks, and reports. Other forms of contact included; conference attendance abroad, study or research periods abroad; guest lectures abroad, evaluation work abroad, and collaboration with foreign researchers. The ideas of Kyvik and Larsen had influence in subsequent studies.

Inspired by previous literature, Smeby & Trondal (2003) identify three forms of internationalisation of research and they included; professional journeys for conferences, guest lecturing, study and research visits, evaluation work and research collaboration. Additional forms include; international and national publishing and the third being national and international research collaboration. These are the same forms of internationalisation used by Kyvik and Larsen. Similarly, Wendt, Slipersæter & Aksnes (2003), describe Internationalisation of research as “an output manifested by increased co-authored publications and

patents, international conferences, research programs, and projects, as well as contacts between individuals, institutions and states". Their work provides a possible range of indicators for internationalisation but limits internationalisation of research to spatial mobility and ignores advances in internet technology.

Other scholars prefer using the concept of "internationality" and define it as co-operation or mobility beyond national borders (Brandenburg & Federkeil (2008). Following their review of previous conceptions of international research engagements, they propose a diverse range of indicators under the concept of "internationality of research." Driven by the need to identify appropriate indicators, their analysis leads to measurable indicators that map research activity. Their approach and emphasis on outputs also provide quantifiable indicators for internationalisation of research. They identified constructs such as; the level of participation in international research projects, sources of third party funding for research, level of mobility for research activity, the level of collaboration with non-nationals, membership in professional bodies, and the levels of publishing in international journals and patents. The design of the indicators falls under the institutionalized level of analysis. The subsequent sections contain an elaboration on each of the forms or dimensions of international research.

### ***International publication***

Publications appear in different journals. In institutional journals, national journals, and international journals. Unlike institutional and domestic journals, international journals is a controversial issue when it comes to defining 'international journal'

and raises many questions. Does it mean a journal publication is made a country different from where the journal is based? Does it mean Journal with ISSN number and publishing papers from various countries are International journals? Does it mean the editors and/or members of the advisory board are from different countries? Does it mean the full text of the publications is English? Does it mean Journals having ISSN number and whether being included in scientific abstracting services making it international? Alternatively, do readers, authors, editorial board, cited papers, and reviewers have to be from many different countries? All these questions often arise in the literature regarding internationality of journals.

Buela-Casal & Zych (2012) review several criteria to qualify a journal as international. Work published in English, work cited in different parts of the world, the existence of an international editorial board, authors being from different countries, a publication is available online would give international access, and having the word "international" would have a clue about the intended purpose. These definitions have the element of foreign in them although Buela-Casal & Zych maintain that a journal published in a foreign country is not international but is simply a foreign journal.

Despite being controversial, international journals assume an important role in the careers of most faculty. Most institutions demand that faculty publish in international journals and often used as one of the criteria for promotions in higher educational establishments. Therefore, international journal publication constitutes an important criterion for research engagement.

### ***International funding***

Access to international financing acts as complimentary funding to available funds in the department for an academic in higher education. Due to decline in government grants for research, academics draw much of their funding from external sources to undertake research (Kyvik & Aksnes 2015). External sources come in the form of donations from foreign governments, charities, trusts and transnational, multinational agencies and companies. On the other hand, external funds for academics often come from consultancy fees from foreign organizations. The additional funding could act as a top-up to the general government grants.

### ***International collaboration***

Collaboration is one of the growing aspects of research activity. Collaboration is manifest in various forms. According to Katz & Hicks (1997), collaboration might involve offering general advice and insights to involvement in a specific piece of research. It could also involve collaborators simply sharing materials and are listed as co-authors while other collaborators share data by correspondence, discussions at conferences, visiting each other or doing different parts of the same project and integrating results at the writing stage. Katz and Martin (1993) explain that collaboration improves access to skills, increases access to international funding, access to expensive research equipment in experimental research involving large-scale instrumentation such as telescopes or particle accelerators, and increased visibility through joint publications.

In recent years, there has been growth in collaborative research. Kyvik & Aksnes (2015) attribute greater collaboration in the international context to the influx of new generations of academic staff with a cosmopolitan outlook in their research practice than previous generations. For instance; they found out that about 50% of faculty who were younger than 35 years of age in 1992, were involved in international research collaboration and the percentage has kept on increasing. By 2013, the percentage of international collaboration by the same cohort had risen to 75%. The authors further maintain that the growth in research collaboration is linked to growth in numbers of doctoral students being trained and backed by growing numbers of professors. The generational practice of doctoral students and academic staff to co-author articles could partly contribute to the general trend in research collaboration.

The motivation for collaborations extends beyond economic interests. Engels and Ruschenburg (2008) point out the need for equal representation of researchers on global environmental assessments for the sake of legitimacy of the evaluations, the search for strong partners institutions to enhance competitiveness for access to funding, and politically inspired collaboration funded by governments or third parties. They also suggest that collaboration is fostered by control over field access and cooperation for the capacity building, particularly in low-income countries. Political and administrative concerns sometimes affect collaborations leading to visa restrictions for international students and guest researchers. The type of productions arising from a specific collaboration is also partly determined by the

motivations of the collaborators. Collaborations, linked with capacity building and common in low-income countries yields little in joint publications.

Various studies highlight patterns of outcomes from international collaborations. Some authors suggest international collaboration varies by discipline and even countries (Katz & Hicks 1997). Nations with significant research communities have far more collaborative articles because they easily find collaboration partners within the country (Luukkonen, Tijssen et al. 1993). International collaboration is relatively more important for smaller countries because researchers find difficulties in getting scholars of their specialization in the domestic institutions and therefore have to seek out to other nations. Engels and Rauschenberg also observe that collaboration arising from access controls yields co-authored publications, but collaboration driven by capacity building may not necessarily contribute to co-authorship. They also indicate that patterns of international collaborations tend to vary by country size. Large countries like the USA have wider disciplinary specialization and researchers find it easier to get collaborators within the country. Researchers from smaller countries are in need of global collaboration because of the limited availability of collaborators in a given specialization. Moreover, budget constraints in small countries and access to expensive research facilities are additional factors affecting collaboration (Melin and Persson 1996). Therefore, it is apparent that smaller countries need collaboration even more than large countries. Therefore, international collaboration is more an important aspect of research to small countries than researchers in large countries.

Geographical proximity also influences on the intensity of international collaboration patterns (Hoekeman, Frenken & Tijssen, 2011). Co-publication decreases with physical distance and also, regional borders, city or institutional networks have a strong pull for collaboration. The effect of affiliations to University research centers on collaborations and research productivity also points to the importance institutional networks. Pornomariov & Boardman (2010) findings from a study of effects of university research centers suggest that academics affiliated to centers were more likely to collaborate with industry, work with colleagues in institutions affiliated to the center, and engage more in interdisciplinary collaboration. Academics who joined the center before tenure benefited more than those who join during tenure. Others point to the importance of generational change, individual productivity, and gender in collaborations. Therefore, international geographical proximity, as well as affiliations to research centers, are among some of the factors linked to collaboration among academics.

### ***International affiliation***

Professional societies offer numerous benefits to members. According to (Good (2005), affiliations offer access to a number of databases, information, alerts about upcoming events, and other activities which may not be accessible to the general public. Good further identifies networking opportunities through periodic meetings, the opportunity to develop capacity through leadership roles, and a chance to forge collaborations with other professionals. Through seminars, workshops, conferences and courses professionals have a prospect to update their

knowledge. Members of societies sometimes also get free or discounted publications on journals and other materials and can, therefore, be motivated to publish more. They are also given priority registrations during their society conventions and many discounts on conference fees or special rates on related expenses including hotel reservations and car rentals. In some associations, members have access to capital and formal coaching or mentoring. Access to editorial board membership in society journals is also prestigious. Editorial board members are gatekeepers and trendsetters in the creation and dissemination of knowledge and board membership signals professional advancement (Pan and Zhang 2013). All these benefits may serve to boost professional performance for affiliated members of the professional society. These advantages enable members to boost levels of engagement even across national borders. However, membership in societies has its dynamics.

Membership patterns of affiliation for professional societies tend to vary on some parameters (Diamond & Haurin 1994). Analysis of data consisting of information on 913 economists of PhDs graduates from universities in the US was used to examine determinants of membership in American Economic Association. Results suggested that graduates would most likely belong to the AEA if the economist were: male, from a highly ranked Ph.D. school, active in publishing research, highly cited for publications, and was did not belong to either the business administration and the agriculture subfields. Moreover, membership in earlier periods increased the likelihood of affiliation in later periods, independent of other characteristics. Economists who received their PhDs at highly ranked schools were more likely to



belong than those who received their PhDs at other schools. Women were less likely to belong to the association than men. Economists who were productive in research, whether in terms of quantity or quality, were more liable to be members of the AEA. Economists who belonged to the AEA at an early period were more likely to belong to the association in a later period. Finally, those who had specialized in the agriculture or business administration subfields were less likely than others to belong to the AEA. The findings have implications that belonging to professional societies is affected by many factors and goes with careful considerations.

Motives for choosing membership in professional associations within each professional field could be diverse (Markova, Ford, Dickson, & Bohn (2013). A study of motivations for membership by Markova et al. found a relationship between tangible benefits and excellent customer service as major factors for attachment. Furthermore, member satisfaction and potential renewal of membership are linked to member assessment of the value of conferences, publications, and certification. Professionals, therefore, choose to join and renew membership for tangible reasons. Furthermore, while promoting membership to younger professionals affirm their professional identity, promoting membership among older members is an affirmation of desired tangible benefits. Due to study limitations, Markova and colleagues suggested future research to reexamine the findings across associations and professions.

### ***International conferences***

Conference participation is one of the forms of communicating research. It is also one of the sources of scientific information and contact among scholars (Haslett 2009). In the UK for example, the growth in conference attendance has foundations in the activities of the Higher Education Academy (HEA) and the Joint Information Services Committee (JISC), the Higher Education Funding Council for England (HEFCE) and others (Smeby & Trondal 2005). Increased initiatives at the national level compared to activity in the international arena could have implications on participation rates for academics at the national and international level. However, scholars from countries with few initiatives are less likely to be involved in international conferences due to limited financial support at home. Therefore, faculty from low-income countries would more likely attend conferences abroad in countries where they might there is support for conferences.

Conference participation also represents one avenue for scholars to have a contact for knowledge sharing. It is no surprise that it has become a useful measure of academic engagement and encouraged self-reflection on practice for all participants. As a measure of conference attendance, Kyvik and Larsen (1994 and 1997), used conference attendance to gauge the relationship between academic contact and the research performance among Norwegian academics. A similar study using conference attendance as a measure of contact among higher education academics was conducted by Smeby and Trondal (2005) to assess international contact among university staff in Europe. The two studies illustrate the importance of conference attendance as a measure of the level contact and

productivity of researchers and therefore could be more relevant in related research.

Although an important mode of communicating research and making contact with peers, some scholars have argued that the importance of conference proceedings is fading. A study by Lisée and Larivière (2008) examined how important conference proceedings were by their citation in other research papers and the results showed the relative importance of conference proceedings were diminishing over time in both the natural sciences and engineering as well as in the social sciences and humanities. In general, conference proceedings only represented 2% of total citations. The results also showed that proceedings age faster than cited literature in general and therefore suggesting also short term impact. On the other hand, it was however also found that despite the impact reducing in most of the scientific literature, engineering had an increase. Given a situation where conference organizers have publication outlets in journals, it is less likely that conferences will fade, and therefore, conference participation and publishing would correlate.

### ***International projects***

International projects for an academic might involve working with international cooperation partners different roles including among others, research projects abroad either as a single inquiry by a lone professor or several multi-phased projects by a team (Weidner 2016). Such projects may include working with an academic institution, a company, a government or non-government institution. Researcher mobility in international projects has advantages (Lola 2005). It could

be the only way to gain access to the research facilities and infrastructures. Researchers may get the opportunity to work with experts from outside their country of origin and often in a different discipline. Chances are that across borders, the researchers work becomes more visible. Integration into multinational and multicultural environment enables rapid academic development. Despite the challenges settling in a foreign country, participation in international projects is a valuable experience contributing to professional development in terms of acquisition of transferable skills beneficial to institutions in the country of origin of the researcher. Researchers with such opportunities would also be expected to get more visibility through publication in international journals.

#### **2.4. Interrelatedness among research specific research dimensions**

A common characteristic among dimensions of research engagement is that they are inter-correlated. Many of the dimensions are associated with one another and understanding this aspect is important towards understanding the impact of study abroad outcomes in the specific aspects. Features of the relationships are discussed to provide a clearer picture.

##### ***Funding and publication***

Funding is one of the essential components of research activity. Access to international financing acts as complimentary funding to available funds in the department for an academic in higher education. Funding has an active role for researchers and increased funding could result in increased publications (Kyvik &

Aksnes 2015). Academics have to draw in a greater proportion of funding from external sources to undertake research following declining government grants for research. Kyvik and Aksnes point out that academic staff who base their research on industry funding, are more productive. The high productivity levels could correspond with the fact that members of academic staff who apply for external financing have to document their past publications while competing for funding. Those who publish more are often considered worthy of funding. The additional funding could be regarded as a top up to the general government grants. Access to external finance has wider implications for research for publications and collaboration.

Additional studies on the impact of funding on research publications before Kyvik and Aksnes study again reported positive and significant effects of subsidy on the number of publications. Chudnovsky, López, Rossi & Ubfal (2008) evaluated the Technology Development Funds and Competitive Research Grants', financed by the Office of Evaluation and Oversight of the Inter-American Development Bank. They compared the performance of researchers with supported projects with that of a control group constructed using researchers who submitted projects accepted in terms of quality but received no funding due to a shortfall in finance. Empirical evidence suggests that research funding improves the academic performance of supported researchers in developing countries.

In addition to publication, research funding also has a positive impact on research collaboration. The outcomes reported in research evaluating the impact of

research grants on collaboration results for a group of Argentinean researchers give credence to the relationship (Ubfal & Maffiolib 2011). A comparison of researchers with funded projects and scholars with non-funded approved projects showed a positive and statistically significant effect of the grants on co-authorship and a positive effect of financing on the integration of researchers into the scientific community. The effect of the funding was also found to persist over time suggesting that researchers might continue to expand and maintain collaboration long after the project.

Challenges sometimes arise in the financing and publication relationship when members of editorial boards fail to disclose a conflict of interest. Recent findings indicate potential conflicts of interest in editorial boards which could potentially bias the peer review process (Janssen, Bredenoord, Dhert, de Kleuver, Oner, Verlaan 2015). In a study conducted to determine the prevalence and financial magnitude of potential conflicts of interest among editorial board members, Janssen et al. investigated editorial boards of five leading spine journals. The Spine Journal; Spine; European Spine Journal; Journal of Neurosurgery: Spine; and Journal of Spinal Disorders & Techniques by extracting data from the journal websites. The findings showed that 49% of the editorial board members had no disclosure statement listed for one of the indexes. The authors take note that disclosure is not a solution in itself as it may bestow more trust on and weight on the biased information. However, disclosure is an element of transparency, and the reader is therefore left to make a judgment. The important lesson for the current study is that in some respects, the decision to publish or not to publish research outputs is

not always the sole decision of the author or the editors but could also be influenced by funding agencies with implications on individual funding rates.

### ***Funding and collaboration***

Past studies have document links between research collaboration and third-party funding. Research shows that researchers funded by companies were more likely to collaborate. In a research using questionnaire data collected from all faculty members of the rank of assistant professor or higher at four universities in Norway Gulbrandsen & Smeby (2005), found a positive and significant relationship between industry funding and research performance. University professors with funding from companies compared to researchers outside academia were more likely to collaborate with researchers from foreign research universities and colleges and colleagues within their departments. Furthermore, results indicated that given adjustments for types of publication and co-authorships, industrial funding would still correspond with high publication rates. It, therefore, tended to confirm the relationship between industrial finance and research collaboration in higher education institutions. Given such a relation, faculty with greater access to international financing would be more likely to collaborate hence a necessary correlation to consider in the current study.

### ***Collaboration and publication***

Arguments in the literature suggest that collaborations increase opportunities for publication. The increase is attributed to the degree of technical competence

brought upon a multi-authored paper by the diverse competencies of the authors and therefore the opportunity for pre-submission 'internal refereeing' (Good 2005). Pravdic and Oluic-Vukovic (1986) analysed collaborative patterns in chemistry at both the individual and the group level and found that scientific output as measured by publications closely corresponds to the rate of collaboration among authors. The analysis also reveals that collaboration with more productive scientists increases personal productivity and collaboration with less productive researchers diminishes productivity. The pattern in cooperation is for the more productive to collaborate with the prolific counterparts and for most of the researchers to seek collaboration with the most prolific authors. Such collaborations would be expected to boost productivity.

The impact of the collaborative activity on publications is still a controversial hypothesis. Some studies aimed at testing the assumption that collaboration corresponds with increased publication productivity had negative results (Ynalvez & Shrum 2009). The results suggested that collaboration has no direct association with either local or foreign publication productivity for a sample of Filipino scientists. Instead, network size and proportion of contacts in the developed countries that could determine access to collaborative projects. The authors argue that collaboration arising from the need for complex instruments and resources seem to have led to the perception that collaboration is beneficial and productive. On the contrary, they assert that network ties and not collaborative groups account for publication productivity. Collaboration was found significantly linked with coordination and communication difficulties, and these challenges happen more



within the country than with external collaborators. They authors suggested the need to examine the collaboration-productivity hypothesis and existing models and identify dynamics and best practices before engaging researchers from developing countries in collaborative research.

Earlier studies regarding the impact of research collaboration and publishing productivity had some positive outcomes (Lee & Bozeman 2005). A curricula vitae analysis supported by survey responses examined 443 academic scientists affiliated with university research centers in the USA. Using the two-stage least squares analysis, Lee and Bozeman found that the number of peer-reviewed journal papers significantly correlate with the number of collaborators. It might also have the implication that, collaboration is increasingly becoming a popular approach to research. On the other hand, it could suggest that faculty with higher levels of international collaborations are more likely to publish in international journals.

### ***Affiliation and publications***

Affiliation could have implications for publications. Mani (2013), indicates that members of an editorial board sometimes have tendencies of preferentially publishing their scientific work. In the five journals urological studied, one journal showed a significant increase of papers published in 'own' journal after assumption of editorship. Three of the journals showed no change. One journal showed a highly significant decrease in publishing 'own' journal after assumption of editorship. No evidence of preferential treatment was found in publishing, and two

key hypotheses for the motivation to publish in same journals edited by authors were offered. It could be a sign of loyalty to the journal, or the editors are driven by the impact factor of the journal. Self-publication would not be synonymous with preferential publication. Unethical conduct in publishing if not checked could, however, favor members.

### ***Conferences and publications.***

Conference participation is an important aspect of higher education faculty. Conference participation is linked to levels of faculty productivity. A study that examined participant categories found a correlation between certain classes of participants with their publication rates. Kyvik & Larsen (1994) categorized conference participants into two groups of scientists; "locals" and "cosmopolitans". Those who target the Norwegian scientific community were named "locals" and participants who take the values and standards of the international scholarly community were categorized as "Cosmopolitans". "Cosmopolitans" were again divided into three groups. Participants who come to learn and without presenting papers were given an intriguing label; "tourists." The second category who submit papers on their initiative were labeled "the motivated." The third type is "the attractive" who are invited by the organizers to present papers. The study does not only provide useful categories but profiles productivity categories of conference participants. For instance; Kyvik & Larsen found that the attractive category was the most productive followed by the motivated. The least productive were the "tourists". Additionally, contact frequency in terms of conference attendance was

positively correlated with international publishing (cosmopolitanism), and that long-term stays abroad had a small independent effect on the international edition. The implication is that a doctorate abroad being a long term stay would independently have less impact. The nature of long-term research stay is not well defined but without qualifying the idea, it would obviously include doctoral study.

The declining importance attached to conferences could have negative implications (Lisée and Larivière 2008). A study by Lisée and Larivière examined how important conference proceedings by their citation in other research papers and the results showed the relative importance of conference proceedings were diminishing over time in both the natural sciences and engineering as well as in the social sciences and humanities. In general, they found that conference proceedings only represented 2% of total citations. The results also showed that proceedings age faster than cited literature in general and therefore suggesting also short term impact. Engineering, however, had an increase. Overall, conference proceedings have a lesser impact compared to other forms of literature with implications that researchers intending to publish in journals are more likely to attend conferences linked to journals. However, conference organizers might overcome this pattern by linking conferences to journals for publications of proceedings. Hence the anticipated decline in conferences could be less than expected.

Correlations among dimensions of research are not fully explored in the literature. A more detailed analysis could bring out the degree of association among all the

dimensions and provide a better understanding of their implications for studies on global engagement in research.

## **2.5. The Global Higher Education Research system**

Competition in science is not a new phenomenon among nations especially when reflecting back to the cold war period. What perhaps is new is the entry of universities following commercialization of education services and which tends to bring all nations and universities on board. The global research system is increasingly competitive and characterized by inequality. The imbalances are so diverse and cover many aspects. For the current purpose, three key aspects relevant to the study and these include; the global distribution of the best universities, research funding across the worlds higher education regions, and the distribution of global research and design (R&D) investors.

Training is an important component of research. None of the world's top 500 universities is located in Africa. The Organisation for Economic Cooperation and Development (OECD) data indicates that by region; Europe has the largest number totaling 207 universities, followed by North America with 166 universities. And East Asia and Pacific has 100 universities. The Middle East and North Africa has 13, Latin America and Caribbean have 10, while South Asia has only 01 university in India. The distribution of the world's best universities has implications on research performance by higher education faculty as it provides inspiration and support needed for research.

Institutional support would perhaps be better with complementary funding support for research. Recent statistics suggest that countries in Sub Saharan Africa have the lowest

research funding rates compared to other regions. The table below compares the top fifteen countries across the three global regions; Europe, East Asia and the Pacific and Sub Saharan Africa. It is evident that even the best funded country in Sub Saharan Africa; South Africa spends far less than the lowest spender among the top fifteen in the European region; the Czech Republic. It also falls below the top six high spenders in R&D in East Asia and the Pacific. It is therefore, likely that researchers from Africa are likely to be less competitive considering the meagre research funding available to them.

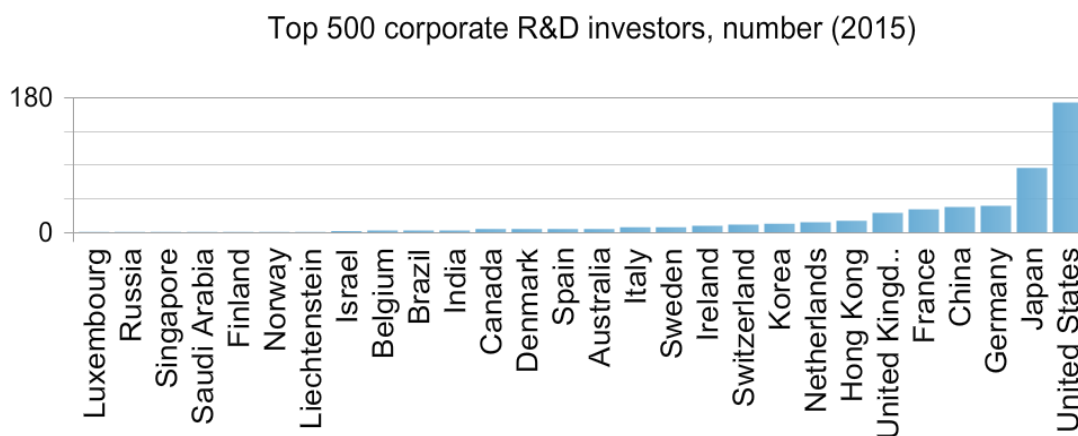
Global funding inequality in research in the best fifteen countries for three regions

S/n	Europe		East Asia and Pacific		Sub Saharan Africa	
1	Czech Rep.	6933	Macao China	41.4	Mauritius	38.6
2	Denmark	8242.9	Mongolia	74	Burkina Faso	39.7
3	Poland	10248.1	Myanmar	94.5	Botswana	76.7
4	Belgium	12634.8	Philippines	477.9	Mozambique	92.4
5	Austria	13481	Vietnam	789.1	Gabon	131.9
6	Switzerland	13669.9	New Zealand	1857.3	Senegal	149.7
7	Sweden	15299	Indonesia	2135.8	Mali	151.2
8	Turkey	15337.7	Hong Kong	2668.1	Uganda	259.3
9	Netherlands	16923.4	Thailand	3304	Ghana	276.5
10	Spain	19750.5	Malaysia	7334.3	Sudan	300.4
11	Italy	30126.5	Singapore	10066.7	Tanzania	348.7
12	Russia	40522.1	Australia	23133.6	Ethiopia	784.4
13	UK	46297.2	Korea	74217.7	Kenya	788.2
14	France	60867.9	Japan	170081.8	Nigeria	855.5
15	Germany	112808.8	China	408829	South Africa	4975
Notes: Million USD Purchasing Power Parties (PPPs) by country across global Regions listing from the lowest to the highest funded among the top ten countries in each region						

Source: Data from OECD (2017) Science Technology and Innovation data.

The global imbalances even extend to the positioning of R&D investors globally. Investors tend to concentrate more in countries with large numbers of top of table universities where they expect greater collaboration with higher education academics. Owing to the low higher performance in countries of Sub Saharan Africa, investors appear to find it a less attractive investment destination and

therefore a low possibility of links with alternative funding sources. The table below reveals R&D concentration mainly in Europe, North America, East Asia and Pacific, Israel in the Middle East and India in South Asia. No country in the African continent appears on the table. Investors in R&D have the capacity to boost research performance in a country to cooperation with higher education institutions through funding and offering alternative employment to researchers as either part time or full time.



Source: Data from OECD Science Technology and Innovation news March 2017

Despite the inequalities, each country continues to develop its own higher education capacity to attain higher levels of competitiveness. Such variation provides justifiable grounds for the continued support for research in disadvantaged countries by countries with well-developed research capabilities. The study acknowledges the glaring differences between countries and regions and does not to make comparisons between countries or regions. The aim to examine faculty research performance within a specific country; Uganda.

## **2.6. Uganda Higher Education Research Context**

Uganda faces a dynamic situation in higher education likely have a significant impact on faculty research. Higher education is experiencing a rapid growth in the number of institutions as opposed to only one in the colonial period. By 2011, the total number of public universities was 09 and private universities had increased to 29. Degree awarding tertiary institutions can award certificates, diplomas, and degrees, although they are not categorized as universities. The total number of institutions continues to grow due to liberalisation of higher education and government efforts to expand university enrolments by creating new universities. The challenges of expansion however have many implications; in relation to the numbers of academic faculty amidst increasing student numbers, eligibility questions for staff, budgetary constraints, donor dependence and potentially diverse university agenda.

Enrolment in higher education are on the increase and this aspect has implications on higher education research. From the year 2000, the enrolments figures in higher education more than doubled and by 2010 the numbers were three times figures of 2000. The growth in higher education is still expected to continue as more private and public universities continue to expand. Statistics from the Uganda National Council for Higher Education reflect that growth rates are still high as shown in the enrollment summary table below. Given such explosion in enrolments, the impact on research time by higher education faculty could be undermined without a corresponding recruitment of academic staff.

## Enrollment Summary for years 1990s to 2010 Year

Year	Number of students	Percentage growth
1990s	26000	170
2000	60000	122
2001	65000	8.3
2002	80000	23.1
2003	85836	7.3
2004	108295	26.1
2005	124313	14.8
2006	137190	9.4
2010	183985	26.4

Source: National Council of Higher Education report 2010

Despite the increasing student enrolments, universities face constraints of recruiting eligible faculty. The National Council for Higher Education (NCHE), the regulatory body, prescribes that faculty need to have specific qualifications for particular positions. However, the number of doctoral graduates is growing at a low pace. For instance, in 2011, the number of Ph.D. holders had grown from 858 in 2010 to 914, Master's Degree holders were 3657, and the remainder had lower qualifications. Part of the solution for most institutions is to employ part-time faculty. NCHE indicates that by 2010, the number of full-time academic staff was 48% of the total and part time 31% while 21% were not categorized. In 2011, full-time staff had increased to 65% and 35% part-time. At university and affiliated college level, a ratio of 71% full time is considered satisfactory and meets NCHE standards. Non-degree awarding institutions are more affected by the inadequacy of full-time staff. Part time staff constitutes 84% of this sub-sector. In Media colleges, part-time staff constitutes 68%, and in theology colleges 63%. Available statistics do not show figures for study abroad and domestic graduates among



faculty. But the diverse categories definitely has an influence on research performance.

Like in many countries today, governments recognize the importance of research in higher education but are sometimes financially constrained to fund doctoral studies. Funding for faculty study is either on a private basis or by donor agencies. In the case of Uganda; Ph.D. and postdoc support for both domestic and study abroad are being provided by various organizations. The Swedish International Development Agency (SIDA) attaches conditions requiring beneficiaries to undertake either part or all of their study abroad to gain international research experience. Similarly, the CAPREx (Cambridge-Africa Partnership for Research Excellence) initiative provides academic research and research management fellowships for Makerere University faculty of Uganda to take a postdoc study in Cambridge. The aim is “to strengthen Africa's capacity for sustainable excellence in research, through collaboration with individuals and equip African academics with the skills, resources, networks and vision to become internationally competitive and successful researchers and research managers”. Initiatives of this kind enable researchers develop capacity and boost the countries competitiveness as a research destination. Funding by donors comes with its own agenda and often covers areas of interest of the donor. This has the potential to influence the rate of research engagement by faculty within such disciplines and specializations.

The same influence could true for the additional donor support is provided for research. For instance, Makerere University which is the largest research-

intensive institution is backed by agencies including; the Swedish International Development Cooperation Agency/Swedish Agency for Research Cooperation with Developing Countries. (SIDA/SAREC) support of Capacity Building for Research in the Faculties of Social Sciences, Agriculture, Medicine and Technology to support research and PhD supervision in the College of Agricultural And Environmental Sciences, College of Health Sciences and College of Humanities & Social Sciences. Support is also available for research under NORAD Institutional Development Program in the Faculty of Forestry and Nature Conservation. IDRC and SPIDER software development projects in the Directorate of Information and Communication Technology Support (DICTS). Irish Aid and Higher-Education and Research Institutes (2007-2011) supporting 'Water is Life' (2007-2011) project. Others include; the Carnegie Corporation of New York, the Commonwealth, the Department for International Development (DFID), German Academic Exchange Service (DAAD). The support for research from various development agencies ensures further development of research capacity but the support is never spread out across institutions and therefore only a few researchers are better advantaged. Comparing researchers from different institutions on research performance would therefore be unfair without paying attention to university effects.

It is worthwhile pointing out that income inequalities will have an effect on research engagement. It is bound to affect especially mobility for academic conferences, publications in international journals, and membership in professional societies where fees are required. While most academics in public institutions enjoy a tenure

and early monthly salaries, most faculty in private institutions and even some in public universities have no tenure and are paid per hour. Remunerations may vary according to faculty rank, qualifications, experience, and sometimes according to the individual. Low pay has led to a high commitment to private consultancy by faculty. Other than being a disincentive to research, the arrangement implies no earnings due to lack of income during breaks. In addition, different institutions pay differently and guidelines on pay for part-time academic staff by the NCHE are rarely enforced. It is important to consider the implications of such inequalities when making assessments on research performance.

Funding issues aside, it is noteworthy that universities vary in research capacity that has been built overtime. A case in point is Makerere University which is the oldest public university established in 1924 and has in many occasions been ranked among the top ten universities in the African continent. Most the remaining universities were mainly established in the 1990s and thereafter. The new institutions are still in the process of construction and establishment of research facilities. They are currently more into teaching as compared to more research intensive old University like Makerere. Moreover, the majority are private institutions and potentially varying motivations and support for research. The research infrastructure and culture in the different universities is another area of variation of research performance among higher education faculty in Uganda.

Despite the imbalances in higher education, the NCHE takes an interest in the research performance of institutions and individual academic faculty. It requires

institutions to maintain and submit records of the research activities and publication dates of each member of staff and include in the institutional annual reports to the NCHE as required by section 126 of the Act (NCHE 2014). Institutional auditors are required to assess the quality of research and knowledge creation of a given institution. The parameters assessed include: the percentage of the university budget devoted to research and publications and other forms of research-related support; and the number of articles published in international journals of repute. Other parameters of interest are; the number of research projects won, completed, and funds earned from research projects by both the institution and its staff; the number of books with an International Standard Book Number (ISBN) published by staff; and the number of patents registered by staff or the institution. These activities suggest the growing demands for globally competitive faculty that pushes the competition up among higher education institutions but does not take into account the inequalities among institutions. Fortunately the study has no interest to compare institutions but compares only faculty irrespective of their institutions. This however, does not resolve the issue of inequalities particularly between public funded and private institutions.

## **2.7. Study abroad and its outcomes**

Over the years the volume of work on study abroad outcomes is on the increase but in most cases, results have often been less consistent on most of the outcomes. Nevertheless, each outcome has its dynamics and hence the importance of discussing each theme separately. The numerous studies can be

categorized under diverse perspectives. Prominent themes included; educational gains of study abroad, language gain, intercultural awareness, and career choice.

### ***Study abroad and educational gains***

Learning outcomes is one of the important factors driving study abroad. As a result, there is keen interest in determining the learning outcomes of study abroad experience. One of the projects undertaken for the purpose is the GLOSSARI project (Sutton and Rubin, 2004). The project results showed that when students participate in study abroad, they exhibit greater outcomes on some general academic outcomes than non-participants. Academic outcomes include; higher levels of functional knowledge, knowledge of global interdependence, cultural diversity, and world geography. However, they also found that study abroad does not impact on other important outcomes such as communication skills. At least, the outcomes were not as disappointing as in a related Study Abroad Evaluation Project (SAEP).

While pursuing diverse outcomes of study abroad, Carlson, Burn, Useem, and Yachimovicz's (1990) under the Study Abroad Evaluation Project (SAEP), compared students who participated in study abroad and another comparable group who did not have the experience. Data was collected from 358 students across four institutions. Among them, 251 studied abroad, and 157 studied on campus and examined outcomes under; academic issues, professional goals, satisfaction, international understanding, and self-efficacy. The study found that although the study abroad scored better than the control group composed of

students who remained on campus, the difference was not significant. Carlson and team concluded that study abroad did not have a positive impact.

While most studies focused on the advantages of study abroad, a study by Oosterbeek & Webbink (2011) conducted in Netherlands, was more interested in examining the impact on the decision to stay abroad following completion of the study period, often popularly known as brain drain. The findings were that award of a scholarship increases the probability to study abroad as well as the number of months spent abroad. The scholarship award also reduced the likelihood of the beneficiary living in the Netherlands in the early years of career by 30 percent points. The implication was that study abroad increased the likelihood to settle abroad by almost 100 percent points and every month of study abroad decreases the probability to live in the Netherlands later on by 4-5 percentage points. The research is among studies that clearly demonstrates the possible brain drain occasioned by study abroad. However, little known about the gains by those who return to Netherlands.

### ***Study abroad and foreign language gains***

Another aspect of interest to research on study abroad outcomes focuses on the foreign language gains experienced by participants. Although there is immense literature on this issue, recent studies provide a fairly more update picture about the language benefits associated with study abroad.

The study by Cubillos, Chieffo, & Fan (2008) sought to establish the impact of the learning environment on strategy use and comprehension. The study sample consisted of students in the range of 18 to 22 years of age enrolled in an intermediate-level Spanish course as a requirement for graduation for nearly half of the undergraduates. Data was collected using a pre and post course written survey instrument. Results suggested that study abroad students showed significantly higher levels in the way learners approached their listening tasks and these differences were associated with the nature of the environment in which instruction took place. However, the study found no difference in gain in comprehension performance between the study abroad and the control group who remained on campus.

A study by Saviciki (2008) affirms the important role of the environment as well as the psychological status and attitude of the participants in language learning. With a sample of 32 U.S. university students studying abroad for three months in Argentina, Saviciki showed that early sociocultural adaptation, higher levels of psychological well-being, and higher affirmations of national identity correlated with language proficiency. The level of immersion or percentage of contacts with both U.S. and host nationals did not affect language proficiency. It became apparent that the quality of the contacts and language spoken with the contacts could be more important than the quantity of contact. Therefore the right students could be made more proficient when provided with an enabling learning environment.

### ***Study abroad and intercultural competence acquisition***

Early studies on intercultural competence were consistent on the positive impact of study abroad outcomes. Williams (2005) study answering the need for outcome assessment in study abroad by exploring the intercultural communication skills outcomes for study abroad in comparison to on-campus students. Using the Cross-Cultural Adaptability Inventory and the Intercultural Sensitivity Index, the two student groups were given to individually self-assess their strengths and weaknesses. A pretest and posttest of two intercultural adaptability and cross-cultural sensitivity were carried out, and a comparison made between study abroad and on campus students to determine the degree of change. The results were in favor of study abroad group and suggestive that students who study abroad have a greater difference in intercultural communication skills after their semester abroad than students who stay on campus. Also, exposure to various cultures was the greatest predictor of intercultural communication skills. These findings were positive on the impact of study abroad exposure.

During the same period, another study conducted amidst appeals for students to participate in study abroad during their university education years. (Shaftel, Shaftel, Timothy, Ahluwalia & Rohini 2007). In response, data collected from a sample of 660 undergraduates using the Cross-Cultural Adaptability Inventory for four consecutive terms was analysed. The results revealed the importance of duration for positive outcomes in study abroad programs. The impact of study abroad depended on the length of the program. It was also difficult to distinguish



between study abroad and control group and therefore suggesting a stable baseline for the students. Study abroad and control groups were different at pretest and therefore assuming their equivalence would be misleading. Therefore, studies that seek to compare study abroad and home campus students would need to rule out the difference between the two groups before the study. Moreover, the students who selected to study abroad were found to be already better in pretest compared to the posttest results of the control group. Students attained the level of change required at posttest and therefore, the importance of different programs of varying lengths to provide adequate opportunities for students at various levels of preparedness. Finally, students who studied abroad already had significant development of plans and planned to study in a foreign language and therefore, the study abroad program increased their desire to enroll in a foreign language program at the home campus. For later studies, the important lessons are to be mindful of the potential differences between the two comparison groups and program duration in determining study abroad outcomes.

Although earlier studies were consistent with the positive outcomes of study abroad later, studies had negative outcomes. The study by Fuller (2007) showed that study abroad had no association with changes in intercultural competence. The study was concerned about the extent to which study abroad impacted on the intercultural sensitivity of theological students. It focused on a key questions: Does a student who studies abroad have a distinct advantage over the one who does not? The study had two objectives: first to determine if there is a significant difference between the intercultural sensitivity developmental stages of students

who have participated in one or more study abroad experiences, compared with students who have not participated in such a program. The second was to identify the significant role if any, that certain pedagogical factors play in influencing the development of intercultural sensitivity among students who have participated in study abroad experiences. Contrary to previous results with a positive impact of study abroad on intercultural development, there was a positive difference between the study group and the comparison group, but the difference was not significant. However, the author acknowledges the limitations resulting from a small sample size and shortcomings of self-reported measurement. Subsequent studies equally had similarly disappointing results.

Rexeisen, Anderson, Lawton, & Hubbard (2008) was a response to the need for administrators and international scholars to document the learning outcomes associated with study abroad and to determine the extent to which they are preparing their students to live and work in an interdependent global community. The study had the aim to assess students four months after returning from study abroad to determine whether GPA and gender affected intercultural development as a result of study abroad. A sample of 54 junior level US business students provided the data following a semester-long study program in London. Like in the previous study, the results were negative. The expected improvement in intercultural development did not occur but only a small evidence of GPA correlation with how students develop intercultural competence in study abroad experience.

Even the most recent study conducted to examine the impact of study abroad on the intercultural competence of participants was the Wabash National Study of Liberal Arts Education which involved analysis of data collected in a cohort study of 2006 (Salisbury, 2011). The data was from 1593 participants from 17 institutions was much bigger than previous studies and had controls for demographic characteristics, precollege attitudes, institutional context, academic pursuits, college experiences and selection bias. Results showed study abroad had significant positive gains on intercultural competence. The effect, when examined, was found to be restricted to one subscale of the overall dependent measure; the inclination towards different contacts but did not appear on the scale of comfort diversity and relativistic appreciation. The interpretation was that study abroad could potentially play a role in intercultural competence development but may not be transformative as claimed. Moreover, there were large size effects across other subscale measures with suggestions that institutions could invest in other less expensive experiences more efficient in multiplying outcomes for students.

### ***Study abroad and Careers***

Study abroad graduates are known to seek and access employment that is international by description. The study abroad impact on the choice of career is one of the aspects examined especially for the ERASMUS program graduates. It indicates a study abroad has a positive influence on the later choice of career (see Bachner 2009; Engel 2010; Teichler & Kerstin 2007; Mahajeri & Gillespie 2008; Wiers-Jenssen 2005; Wiers-Jenssen 2011; Wiers-Jenssen & Try 2005).

ERASMUS program studies consistently indicate that, compared to those who had acquired a similar degree from Norway students who studied abroad, often find employment in internationally related jobs with relatively higher salaries although they are also likely to face a greater risk of over-education and spending longer periods of unemployment (Wiers-Jenssen 2005).

Drawing data from the Nordic Graduate Survey 2007, Wiers-Jenssen identifies similar results among students from business and administration, science, technology and engineering, and social sciences disciplines. Returnee mobile students were found to have jobs characterized as international, and chances of getting such jobs tended to be increased by the amount of international experience. Considering that mobile degree students have longer sojourns abroad, more time acquiring linguistic and cultural skills, it was surprising that the expected difference between mobile degree students and exchange students were low (Wiers-Jenssen 2011). The conclusion is that study abroad has an influence on job choice and the duration abroad did not affect possibilities of success in choices made. Accumulated mobility capital acquired by the exchange students in comparison with the study abroad graduates explained the small variation between the two groups.

The results are supported by previous research findings from the VALERA (Value of Erasmus) study. The study triangulated student responses with those of the employers and university leaders, while seeking to gather information on the professional value of an Erasmus study period and to learn about study abroad

conditions which might be conducive to a high professional impact (Engel 2010). International experience, especially foreign language proficiency, was found to be a major factor in employee recruitment decisions. Erasmus graduates also reported an enhanced international focus of their work tasks and their employment situation. Many of them considered working or worked abroad at one time or were employed in an internationally oriented organization and had taken over internationally oriented tasks. Equally reported was the frequent use of language spoken in the Erasmus host country, continuous use of knowledge about the host country and ongoing business contact with other nations other than the Erasmus country, hence suggesting ongoing international engagement. It would, however, be interesting to know the extent of the intensity of the engagement across time.

Outside the ERASMUS program, other surveys suggest study abroad graduates desire to work with companies having international networks. Orahod, Woolf, & Kruze (2006) in a retrospective survey of business graduates of Indiana University in the US observe that graduates who studied abroad have a significantly larger interest in networking for companies with an international component. They work with international clients/customers and show more interest in working abroad compared to non-study abroad alumni. Part of the explanation for the lack of influence on career choices is that the participants were business students who appear to have taken career decisions before enrolling in study abroad.

In East Asia, doctoral graduates who studied abroad in Western countries had the favour of institutions seeking to enhance global competitiveness for world-class

status among universities (Shin and Kehm 2013). Favoritism was fueled by perceptions that they are more productive than domestic graduates. Patterns of favoritism for foreign trained doctoral graduates feature across many countries including Malaysia, China, Singapore, South Korea, Hong Kong, Taiwan, and Japan (Shin and Kehm 2013). Prompted by concerns over the preferential recruitment of foreign-trained academics research was conducted to compare the productivity levels of study abroad graduates (Shin, Jung & Azman 2014). Surprisingly, evidence indicated that domestic graduates in higher education systems compare favorably with foreign graduates especially in Hong Kong, Korea, and Malaysia. In some respects, foreign graduates were even less productive in the arts, humanities, and the social sciences even when more weight is given to international publications. Although issues of quality were not discussed, it serves to emphasize that the apparent rationale for their recruitment appears to go beyond productivity and perhaps motivated by the need to introduce an international flavor to the institutions. In that same way, institutions gain recognition as global institutions by the language of instruction, intercultural competence and possibility tapping on the global social capital of such faculty.

Contextual factors to a greater extent linked to with career outcomes following study abroad. European studies assessing outcomes in terms of student home country and disciplinary backgrounds based on students of ERASMUS programs provides growing evidence of variations of impact. While ERASMUS students and employers maintain that internationally experienced students turn out to be superior in many professionally relevant competencies and are far more frequently

internationally mobile during the first few years of their careers, the glamour associated with study abroad also appears to generate mixed outcomes across regions. On the one hand, results revealed the professional value of temporary study in another European country is on the decline in Western Europe compared to Eastern Europe. Although employment dimensions remain higher especially for business studies and engineering disciplines, most ERASMUS students in other disciplines did not believe that they excel in income and social status during their early career (Engel 2010). The outcome suggests the possibility that, increasing fortunes are only sustainable up to a certain point and after that, differences associated with study abroad between participants and non-participants diminish. Do research outcomes of study abroad also suggest such diminishing returns in higher education research? For alumni from Central and Eastern Europe, a period of temporary study in another European country has remained an exceptional and professionally rewarding experience (Teichler & Kerstin 2007). Overall, however, ERASMUS students across countries continue perceiving the study period abroad as a route to international experience in terms of mobility, competencies, and work tasks but hardly a promising career enhancement as compared to at home graduates.

More rigorous studies investigating the impact of study abroad on publication in international journals find a correlation between study abroad and international journal publication. Yang & Lee (2012) conducting a study in Korea found that faculty with international degrees published more than those with domestic qualifications. The evidence was mainly found in high impact journals. Increased

participation in international conferences by graduates with foreign degrees and with the consequence of growing preference for foreign trained doctorates among incoming faculty. Studying for a doctorate abroad was demonstrated to have a positive impact on productivity. This positive outcome was attributed to the possibility that study abroad graduates have a diverse network of contacts whom they continue to link up for research and publications. The study is among the few that directly address the relationship between study abroad and global engagement in the research domain.

In summary, study abroad has much influence on career, across time (decades) but variations exist across countries, geographical regions and professional disciplines hence pointing to the need to examine the impact of such contextual differences. However, comparison literature is handicapped by limitations in research on outcomes in countries especially in Africa, Asia, and the Middle East. Besides, few studies have considered longitudinal approaches to capture the time element and instead use cross-sectional surveys. These are some of the areas that still need to be explored further in future studies. The literature covers a broad range of careers and sometimes not specific. The study proposes to examine the outcomes on a specific career; the research career of an academic and focus on doctoral study abroad as opposed to the study of undergraduate study abroad. Studies that specifically focus on outcomes in global research are not readily available. The current study is unique in that it attempts to fill this gap focusing on global engagement in research in higher education.



## **2.8. Study abroad factors and global engagement**

One of the strengths of SAGE studies is the attempt to link specific aspects of study abroad to specific outcomes which enable identification of mechanisms behind outcomes. From the perspective of the Paige Model, study abroad factors are conceptualized in four categories; demographics, destination, depth, and duration. The influence of demographics on the dimensions of research engagement is quite overwhelming. Even at the level of investigation the impact of demographics on research outcomes is well documented.

### ***Destination and global engagement***

The question of the relationship between the study destination and later life global engagements was raised in the SAGE study but with disappointing results. In other words, findings suggest that destination during study abroad had no significant correlation with global engagement in the various dimensions. The results of correlations between global engagement Indices and the destination Index was statistically significant, but this was considered weak given the large sample size. The findings suggested that placing students in abroad per se may have limited impact and yet even more traditional destinations can contribute significantly to global engagement. The results have implications for the design of study abroad programs. However, the results are limited to outcomes that were under study and may not be generalizable to those outcomes that were not measured in the study. It might, therefore, be necessary for similar studies to be conducted for the assessment of the results in other aspects of global engagement. Caution needs

to be taken not to generalize the finding on the destination to all other kinds of global engagement. The implication is the need for further study on the impact of destination on other aspects of global engagements that are of interest rather than attempt to extrapolate current findings.

### ***Depth and global engagement***

The SAGE study results suggested that the more in-depth the experience, the stronger global engagement was likely to be (Paige et al. 2009). The outcomes were particularly strong in volunteering for social justice, civic engagement, and global leadership. This result echoes well with Norris & Gillespie (2009) findings. A full year course, enrollment in hosting university, internship, and host family living arrangements were found to contribute positively to later career life. Their comparisons of career impact by decade also yielded statistically significant results indicating that study abroad affects careers across generations. Evidently, IES alumni who pursued global careers reported influences not only on career direction pursued, ability to speak a second language, internship experience, acquisition of skills which influenced career path but also relationships that became professional contacts and eventually changed their career plans. The outcome suggests that the effect of study abroad on career placements and international engagements is enhanced by the quality of the preparatory phase.

While many studies come up with seemingly positive findings, the findings by Savicki (2011) tend to degrade the positive outcomes of the depth of study abroad. The study reports a marginal relationship between time and proficiency scores

after US university students spending three months in Argentina for language skills before and after the program. It also shows that socio-cultural adaptation, higher levels of psychological wellbeing, and higher national identity affirmations correlated with language proficiency. There was no relationship with depth and also no significant relationships were found between demographic backgrounds and language abilities. The lack of relationship with depth however raised further questions about the quality of the contacts and the language spoken during the contacts. These findings suggest the need for further testing of the time factor in study abroad outcomes.

### ***Duration and global engagement***

Studies have emerged that reveal the importance of length of the study abroad experiences to subsequent global engagements. The length of programs is reported to correlate positively with the development of student intercultural sensitivity. In the study consisting of 28 students enrolled at the University of Maryland, both quantitative and qualitative data showed more development of intercultural sensitivity in the students in the longer Mexico City program than those in the shorter Taxco program (Medina-Lopez-Portillo 2003). This study is part of the wider sections of studies that suggest the positive impact of a longer study abroad period in the development of positive global attributes. However, it does not claim to speak about the development of other aspects of global engagement other than intercultural competence.

Basing on common wisdom that more is better, Dwyer (2004) finds longer study abroad durations to have better outcomes. Dwyer used data from an IES study of its alumni designed to determine relationships between program features and the results. In this particular study, program length options included full-year, fall semester, spring semester, and summer term. The results were interesting in all the outcome areas under assessment. General, academic, intercultural, career, and personal, study abroad for a full year resulted in greater perceived effects than did participation for shorter periods of time. The study, therefore, gives more credence to the common assumption that longer durations are more efficient in increased study abroad outcomes.

Research on foreign language competence shares similar findings relating to intercultural awareness studies. Some recent works reinforce the argument in favour of duration in the acquisition of language skills. Sasaki (2011), found that a longer period abroad improved second language abilities of students. Students showed improvements in second language writing ability and also become intrinsically motivated to improve writing. The implication is that longer durations abroad do not only impact on language proficiency but also impact on motivation. However, there are contrary views regarding the impact of duration on outcomes of study abroad.

Other studies have found the negative impact of duration on study abroad outcomes. For Paige and colleagues, duration of the study abroad experience did not matter in terms of outcomes. They found no relationship between duration and

outcomes. This particular result is interesting because it also contradicts common sense expectation. Indications are that reactivity effects of respondents exaggerating outcomes even of shorter durations could have compromised results. While acknowledging alternative positions on global engagement and aware of the various types of global engagement, it is possible that duration could be impactful in other forms of engagement.

Meanwhile, other studies equally downplay the role of duration in subsequent global engagement. Instead, they argued that it is the number of contacts that was found to correspond following a sojourn which had an impact on international publishing (Kyvik & Larsen 1994). Faculty with a long-term professional stay in another country had more contact abroad than colleagues without a similar experience. Also, the degree of international contact was found to correlate positively with the high partial correlation between the level of international contact and publishing in a foreign language adjusting for a research stay abroad. They concluded that professional stays in foreign countries alone are not enough to affect international publishing. Such stays abroad need to be followed up by keeping in touch with overseas contacts. Otherwise, there would be no difference in productivity between those who stayed abroad and those with and those who spent within the one country. Productivity differences between the stays abroad and domestic based faculty were small on total output on publications and greater on conference attendance. Moreover, it was stronger on international as opposed to domestic publishing. Therefore, the two positions on the role of duration of global engagement still present an unresolved debate and requires further study.

### ***Demographics and global engagement***

Many studies acknowledge the role of demographics in influencing global engagement outcomes. Paige and colleagues identify demographics to include age at study abroad, gender and ethnicity. Their findings suggested that demographics have an impact on levels of global engagement outcomes (Paige et al. 2009). In the study by Rosterd & Arknes (2014), age, gender, ethnicity and academic age in research (experience) and academic discipline were found associated with changes in levels of research engagement. Despite studies of the impact of study abroad on global engagement being few, literature on the influence of demographics on research performance is vast. The same influences would be expected in studies associated with research performance whether as overall research productivity or on at a global level as in the current study. Therefore, the links between demographics and research engagements were explored in the literature and discussed.

### ***Demographics and publication***

Several studies have highlighted the importance of demographics in explaining research productivity. Nowhere in other dimensions has it been more pronounced as in publications. Paige et al. (2009) referred to such characteristics as age, gender, ethnicity and socio-economic backgrounds of study abroad participants. The study revealed that among the four demographic elements examined, age and socio-economic factors are significant in explaining global engagements, while ethnicity was not relevant. In a subsequent study on global engagement, Murphy

et al. (2014) emphasized the importance of demographics and suggested that future studies need to take into account the possibility that pre-existing characteristics of study abroad participants could influence some of the differences found in the levels of global engagement between the two groups.

Furthermore, the links between demographics and productivity, in general, has been at the center of many studies. The gender influence on levels of engagement has been examined from the perspective of research productivity in Norwegian universities. For instance; in Rosterd & Arknes (2014) study on the specific influence of variables; age, gender and academic position on research performance conducted in four Norwegian universities found that females publish less than males. It went further to suggest that, professors were found to publish more than Associate Professors, or post-doctorates and that physical age and academic age (experience) were found to be related to publication rates. Physical age publications rates were found to have a U-shape with the highest performance being between 40-50 years old. Overall, the researchers concluded that productivity was a function of age, a percentage increase in age, academic position and gender for all disciplinary fields that were investigated. With a sample of 12000, the findings were consistent with previous studies relating to the same variables. The study was focused on research productivity and therefore combined both localized, and globalized production, and therefore impactful factors are therefore bound to overlap. A study investigating research outcomes assessing the role of demographics would, therefore, be inadequate without taking into account the five demographic characteristics; physical age, academic age

(experience), gender, disciplinary fields and academic position already associated with research performance. Demographics play a significant role in explaining the importance of study abroad on global engagement.

In some education systems, academic rank/appointment is associated with publishing. Publishing in international journals is one of the benchmarks for recognition in an academic career and with associated career benefits for faculty in higher education. Beckmann & Schneider (2013), investigating the relationship between publications and appointment used new panel data set for 889 German academic economists for over a quarter of a century and found that publications are relevant for professorial appointments. However, the promotion was also linked to a small adverse effect on productivity when controlling for 'star' academics. Moreover, the positive effect of publication activity on the probability of getting an appointment increases over time. The continued increase in the probability is further evidence to the growing importance of publications on appointment in the German context. Findings also showed the small adverse effect of tenure on publications which was, however, absent in the period before 1995. In explaining the result, the authors suggest that in early years intrinsic motivation did not fall to the same extent after tenure compared to the later period.

Differences in productivity were also stronger on disciplines especially in the humanities and the social sciences compared to differences in natural and medical sciences and technology. For Kyvik and Larsen, the discipline differences between fields were explained by the cosmopolitan nature of the sciences compared to the



humanities and social sciences. They further indicate that international publishing is the norm in the sciences while the domestic edition, especially in the local language, is the standard in humanities and social sciences. Particularly in the Norwegian context, language problems could constrain the motivation to publish in a foreign language due to the essayistic style of articles humanities and social sciences which would not be problematic to those who had long stays abroad and those frequenting international conferences and have reference contacts abroad. A researcher in the sciences would have lesser difficulties in international publishing due to the codified nature of science. In related studies examining disciplinary differences in publishing, Kyvik and Smeby (1994) report disciplinary differences having an effect on publication practices for academic staff and Ph.D. students. Ph.D. students with projects related to their supervisor's research had an independent effect on the publication activity of faculty especially in the sciences and no force for social sciences and the humanities. Therefore, academic disciplines could moderate the impact of study abroad on publications.

Some demographic factors correlate with publication outcomes. Age, gender, socio-economic status, and experience are some of the factors related to research publications (Kyvik 1990). Age was reported to affect publication activity in a curvilinear manner with peaks at 45-46 years of age and eventually declines among researchers of over 60 years old but with variations by discipline. Kyvik suggests little variation existed in the social sciences. In the medical and natural sciences productivity was found to continue declining with increasing age. The differences in changes in productivity correspond with differences in the

development of scientific knowledge in the different fields. Fields with continuous changes in scientific methods and equipment are likely to experience an early decline in productivity as old scientists fail to cope with rapid change.

Other than age, the incentive and reward system in terms of promotion were found to enhance faculty productivity (Olsen, Kyvik & Hovdhaugen 2005). As a result, a country like Norway strengthened the link between salary and publications and funding by 1991. The implication was that associate professor could apply for promotion to full professor by research output and not the availability of vacancies. Besides, individual salaries became negotiable with trade unions by the applicant's research productivity. Furthermore, published output became a parameter in the incentive-based research funding model of universities (Sivertsen 2010). However, the prominence given to journal publications for access to funding and reputation of the department and the university has had the drawback of preference for publishing journal articles rather than reports and the practice of fragmenting research output into different but closely related journal articles (Kyvik 2003).

Perceptions in academia that women publish less than male faculty were tested in many studies. The result shows that publishing by both male and female either has no difference or differences found in some disciplines. A study by Bird (2011), found that overall, female academics contribute to a lower proportion of journal articles than the percentage of discipline staff that they constitute. However, within certain disciplines (social policy and psychology) women publish articles at a level comparable to the proportion of the discipline that they constitute. The implication

of such findings for the current study is that difference in publication patterns could be mirrored in related studies on productivity even at a global level as in the present case. It is clear that past studies suggest a correlation between study abroad and international publication. Study abroad increases the number of contacts abroad. Also important is that having international contacts abroad could enhance the international publication. Therefore, it would be expected that those with a doctorate abroad would have more research contacts abroad and therefore publish more. The outcome might, however, be affected by factors such as age, gender, academic discipline and the reward system.

### ***Demographics and collaboration***

In some studies, demographics affect collaboration outcomes. Lee & Bozeman 2005 also found the presence of moderating variables; age, rank, grant, gender, marital status, family relations, citizenship, job satisfaction, perceived discrimination, and collaboration strategy. However, when the number of publications is divided by the number of authors, and the same model is applied, the number of collaborators is not a significant predictor of publishing productivity. In both cases, effects of research grants, citizenship, collaboration strategy, and scientific field remain significant. According to Lee and Bozeman, it is important to understand the consequences of the individual and environmental factors when developing strategies that lead to beneficial collaboration at various levels including; individuals, groups, institutions, and academic disciplines. The study

demonstrates the need for awareness of the role of demographic factors when determining the association between collaboration and other variables.

Studies have linked collaboration in research to the emergence of a young generation of researchers with a new approach to research. Kyvik & Aksnes (2015) attributed to increasing collaboration trends in the international context to the influx of new generations of academic staff with a cosmopolitan outlook in their research practice than previous generations. For instance; they found out that about 50% of faculty who were younger than 35 years of age in 1992, were involved in international research collaboration and the percentage has kept on increasing. By 2013, the percentage of international collaboration by the same cohort had risen to 75%. The authors further maintain that the growth in research collaboration is enhanced by growth in numbers of doctoral students being trained and backed by growing numbers of professors. The generational practice of doctoral students and academic staff to co-author articles could partly contribute to the general trend in research collaboration.

Like in publications, demographics still plays a significant role in the level of collaboration. Partnership improves productivity among authors of different sex especially in most of the experimental fields except in mathematics (Mauleo'n, Hilla'n, Moreno, Go'mez & Bordons 2013). The increase in female publications has been attributed to cross-gender collaboration. The authors report that female contribution tends to either remain or grow in almost all areas as a result of cooperation. However, in Mathematics, they found that the share of papers with

cross-gender collaboration increases very slightly while the contribution of females tends to decline. They conclude by suggesting that cross-gender collaboration could be beneficial in fields where women are the minority. The implication is that women who collaborate more are likely to publish more compared to their colleagues who do not collaborate. Hence assessing individual productivity would require controlling the influence of collaboration.

Patterns of international research collaboration have also emerged at the country level. Variation has been reported among disciplines and even countries regarding the importance of international collaboration (Katz & Hicks 1997). On one side, it is argued that nations with significant research communities have far more collaborative articles than smaller countries (Luukkonen, Tijssen *et al.* 1993). On the other hand, international collaboration is relatively more important for smaller countries because researchers find difficulties in getting scholars of their specialization in the domestic institutions and therefore look abroad for them. Moreover, budget constraints in small countries and access to expensive research facilities are additional factors affecting collaboration (Melin and Persson 1996). It is apparent that smaller countries are in need of teamwork more than large countries. Overall, collaboration has important implications for research. It is affected by the generational change, gender equality, and country effect. Therefore, scholars from small countries are likely to seek collaboration with scholars from large countries. The relationship between productivity and cooperation remains unresolved. These aspects are important in the current study that includes the collaboration as one of the key measurement dimensions.

### ***Demographics and affiliations***

The value of affiliation to a professional association is associated with demographics and particularly concerning gender and academic discipline (Diamond & Haurin 1994). Analysis of data consisting of information on 913 economists of PhDs graduates from universities in the US was used to examine determinants of membership in American Economic Association. Results showed that membership would most likely belong to the AEA if the economist were: male, from a highly ranked Ph.D. school, active in publishing research, highly cited for publications, and did not belong to either the business administration and the agriculture subfields. They also found economists who received their PhDs at highly ranked schools were more likely to belong than those who received their PhDs at other schools. Women were less likely to belong than men. Economists who were productive in research, whether in terms of quantity or quality, were potential members of the AEA. Economists who belonged to the AEA at an early period were more likely to belong to the society in the later period. Finally, those who had specialized in the agriculture or business administration subfields were less likely than others to belong to the AEA. Membership in earlier periods also increased the likelihood of attachment in later periods, independent of other characteristics. The findings have implications that belonging to professional societies is affected by many factors and goes with careful considerations.

The negative pattern of low female participation in societies appears to be changing. The gap between females and males is reducing over the years

(Mauleo'n, et. al. 2013). Mauleo'n et al. further revealed that large editorial boards and having a female editor-in-chief would correspond positively with the presence of women in editorial boards. Concerning the representation of women by disciplinary area, results showed the tendency for women to concentrate on specific fields. In particular, women tend to focus in journals of humanities and social sciences and less in technology. Average numbers of female editorial board membership were substantially lower than those of their presence among academics although not significantly different from those of women in the highest academic rank in the Spanish HE sector. The findings are an indicator that senior female scientists were well represented on editorial boards, and the positive association between female authorship and female editorial board membership would imply that increased women among authors may inspire more women to publish.

Professional associations are voluntary organizations and motives for choosing membership are often diverse. Markova, Ford, Dickson, & Bohn (2013) study of motivations for membership by Markova et al. found a relationship between tangible benefits and excellent customer service as major factors for membership but the benefits were connected to age group. Therefore member satisfaction and the potential renewal of membership was based on member assessment of the value of conferences, publications, and certification. Noted was that, while promoting membership for younger professionals affirms their professional identity, promoting membership among older members is an affirmation of desired

tangible benefits. Due to study limitations, Markova and colleagues suggested future research could reexamine the findings across associations and professions.

### **2.9. Durability of outcomes across generations**

Many studies on study abroad outcomes are conducted mainly in the United States. Participants are assessed within a short time following return to determine immediate impact and tracer studies are done to determine the long-term impact of study abroad experience. In most of the studies, the study abroad experience is reported to have a long-term impact on diverse aspects of social life for the alumni.

A retrospective survey by Paige, Fry, Stallman, Elizabeth & Jasmina (2010) examined relationships between study abroad and global engagement as they unfold throughout a person's career life. They assessed global engagement in terms of participant activities such as the practice of volunteering, philanthropic donations devoted to the common good, friendships with people from other cultures, and engaging in internationally-oriented activities for leisure, which enriches their lives and the wider community. A sample of 6,378 former study-abroad and 5,924 non-study abroad participants representing U.S. 20 colleges and universities, and two additional education abroad providers for study abroad students were involved in the study. They found that study abroad outcomes in relation to their educational and occupational decisions were related to the depth of the experience and participants demographics. However, the main drawback of the original study was the lack of a comparison group.



A related follow-up study (Murphy, Sahakyan & Yong-Yi 2014) building on the spirit of the SAGE project examined the long-term social impact of study abroad using a similar perspective addressed in the SAGE study. Researchers involved a sample of 1283 alumni consisting of former undergraduates sourced from the alumni of the same U.S. institution. It used alumni of the B.A. and B.S. degree programs of the University of Wisconsin-Madison (UW-Madison) in the United States, who completed the Bachelor's degree between 1980 and 2010. Survey results remained consistent with claims by the SAGE that the alumni who studied abroad had higher levels of some types of global engagement than alumni who did not study abroad. No difference was found in the two groups regarding social entrepreneurship or in knowledge production, at least with reference to the quantity of output within the context of the analyzed data. The study, therefore, reinforced the SAGE ideas but perhaps their joint contribution is in examining the association between specific factors of study abroad and specific outcomes. In addition, these are some of the few studies that consider the impact of duration following study abroad experience.

In summary, the literature suggests that even after many years following study abroad experience still has an impact on global engagement. However, although it studies tends to focus on international careers for study abroad during undergraduate years, they give less attention to doctoral graduates. Also, despite the emergence of literature on career engagements, the focus is general and not specific to professional disciplines. The target group is often too diverse and have little in common except studying abroad at a given period. It is also difficult to draw

a line between what counts as short term and what is considered long term. This study attempts to extend the assessment of global engagement into higher education research particularly for doctoral graduates who studied abroad.

### **2.10. Limitations in literature**

In reviewing literature, some shortcomings were identified in the literature either observed by the authors, reviews of the literature or noted during the current review. It is evident from available studies that the relationship between study abroad and global research engagement has not been examined in the available literature. It is clear that a few attempts have been made to examine the broader influences of study abroad on global engagement in less specific professional contexts. The shortcomings in literature are further complicated by the limitations in the geographical scope with little about Asia, Africa, and countries in the Middle East. The implication is that studies on global engagement of study abroad experience are needed within the context of low-income countries for a complete picture of its impact for various categories of countries.

Although study abroad is not a new phenomenon and its outcomes have been investigated for decades, there is little research on its impact on specific professional practices. Assessments that cover different professions are often concerned with career opportunities but little to do with career performance with a specific professional practice. Aware of globalization forces in the modern era, a more focused approach to study abroad outcomes in professions is needed to ascertain

the impact as well as inform decision making as well as training institutions on current needs.

A number of limitations affect studies on study abroad outcomes. In the literature, Dwyer (2004) points out the challenges of the absence of an appropriate comparison group in assessing study abroad outcomes hence preventing causal inferences. He makes recommendations for potential future research projects to include analyzing outcomes by; country, language of study and the program model used. In addition, probing different career paths of students by decade to reveal the changing employment contexts within which students apply their study abroad experiences, analysis for impact of host-country university enrollment on multiple outcomes, men versus women, outcomes on different housing models, effect of host-city size on outcomes, and the influence of an intensive foreign language program on outcomes. Franklin (2007) further suggests the use of a control group useful in confirming causation of professional developments. Additional recommendations for measuring the professional value of study abroad is by surveying employers and which could help support or disclaim assertions made by alumni. The SAGE project faced limitations due to lack of a control group and that a cross-sectional sample was used to study the long-term impact of study abroad experience instead of a longitudinal tracer study.

Still, on methodology, there have been concerns raised by researchers about challenges of self-reported data on perceived impact of study abroad. Little effort is often made to address this problem, and yet it has the potential to distort

outcomes. Such methods rely heavily on the use of existing scales and devised questionnaires to elicit data. Alternative methods that overcome the problem of self-reports are needed. The current study takes into account this concern and attempts to seek ways of overcoming it by adopting alternative methods.

The current study contributes to these recommendations through an innovative approach of generating and using a longitudinal data set, the inclusion of a comparison group and examining outcomes across time and global regions.

### **2.11. Conclusions**

Study abroad graduates are seen to be more successful at accessing international jobs and making use of former contacts in study abroad experience and many others. Variables such as age, levels of education, academic discipline, and depth of experience are endogenous to both study abroad and international engagement in research. In addition to study destination, previous overseas experience, and duration of the exposure have been found to influence outcomes. Work experience sometimes referred to as maturation and defined as years of service as an academic in higher education and levels of appointments are expected to have an influence on engagement. Moreover, there are suggestions of interrelatedness among the dimensions of international research whose influence on productivity has not been accounted for in previous studies.

While some follow-up studies have been conducted, to investigate the professional performances that constitute the core skills of higher education training abroad,

there is also need to further assess how identified variables affect subsequent professional behavior in different contexts, particularly in the research domain.

## **Chapter 3 : Research Methodology**

### **3.1. Introduction**

The chapter deals with the selection of methods for studying the extent to which doctoral study abroad experience is associated with global engagements in research following the return of graduates to countries of origin. In the subsequent sections, the conceptual model underpinning the study, followed by a discussion of methodologies, study designs used in assessing outcomes of study abroad and an elaboration on the Curriculum Vitae analysis method. The final sections cover measurement, analysis methods, reliability and validity issues as well as the potential ethical problems in the study. The chapter concludes with the timeframe presented towards the end of the chapter.

### **3.2. The Theoretical framework**

The study shares commonalities with the SAGE study. It builds on a common body of knowledge regarding personal and professional impact of study abroad by assessing its long term effects on global engagement (Paige et al. 2009; p.3). Like SAGE, it is in response to the emerging global competition (Paige et. al 2010). The current study however, aims at extending discourse on global engagement to professional development and specifically, research. As a consequence, the current study borrows the global engagement model but makes conceptual modifications especially on outcomes. It also differs in the research approach and method used, the population and the study setting and that makes the study unique study.

The global engagement model is inspired by social capital theory by Coleman (1998) and the Flat world theory by Friedman (2007). Social capital plays an important role in forging networks of relationships of mutual acquaintance and recognition. Coleman (1998), highlights the functional value of the relationships possessed by an individual or community. He further suggests that social capital, facilitates productive activity and with examples, he demonstrates that a group with extensive trustworthiness would accomplish much more than without that level of trust. An international network would provide a backing to members as a deserved credit. In particular, such networks work as information channels for members though the networks could be maintained for other purposes. The implications for higher education research is immense. Networks are critical to the process of career building and research practice. Study abroad has the potential of providing global networks of study colleagues and former research supervisors. In global research engagements, therefore, international graduates have a global network able to facilitate and maintain high levels of global engagement. As Coleman maintains, social capital comes in the form of information channels provides the basis for action and which could be accessed through social relations. Researchers need information about opportunities and this could be accessed through acquaintances. By gaining access to training and international research opportunities, it is also possible for international social capital to contribute to the development of additional human capital for social group members. The relevance of the Social Capital theory to the current study needs less emphasis. Foreign doctorates would be expected to have better access to international contacts and

information access. They have the potential to become more globally engaged in research than domestic graduates. A similar scenario would be expected to unfold under the Flat World Theory.

Basing on the Flat World Theory, Friedman (2007) argues that with the current technological advancement, the internationalization of firms, emergence of outsourcing and the possibility of networking, the world is becoming a level playing field where individuals are empowered. The theory predicts that developments in technology were making the world increasingly competitive and allowing people from different parts of the world to compete with everybody else. According to Friedman, technology had made it possible for more people working from different corners of the world to collaborate and compete in real time for various types of work on a more equal footing than at any previous time in history.

The social capital theory and the flat world theory appear contradictory but are related. The flat world theory could be interpreted to imply that social capital is less important than the importance of geographical proximity brought about by technological advancement. The argument of the study is that social capital builds a better a foundation for future interaction. Even in a flat world, it remains an added advantage for faculty who studied abroad. Moreover, it might also be argued that not all parts of the world experience the flattening effect at the same pace. The less technologically developed parts of the world especially in Africa can hardly be compared with the most technologically developed parts of the world. Social capital therefore could still be important in widening engagement. Accepting the flat world



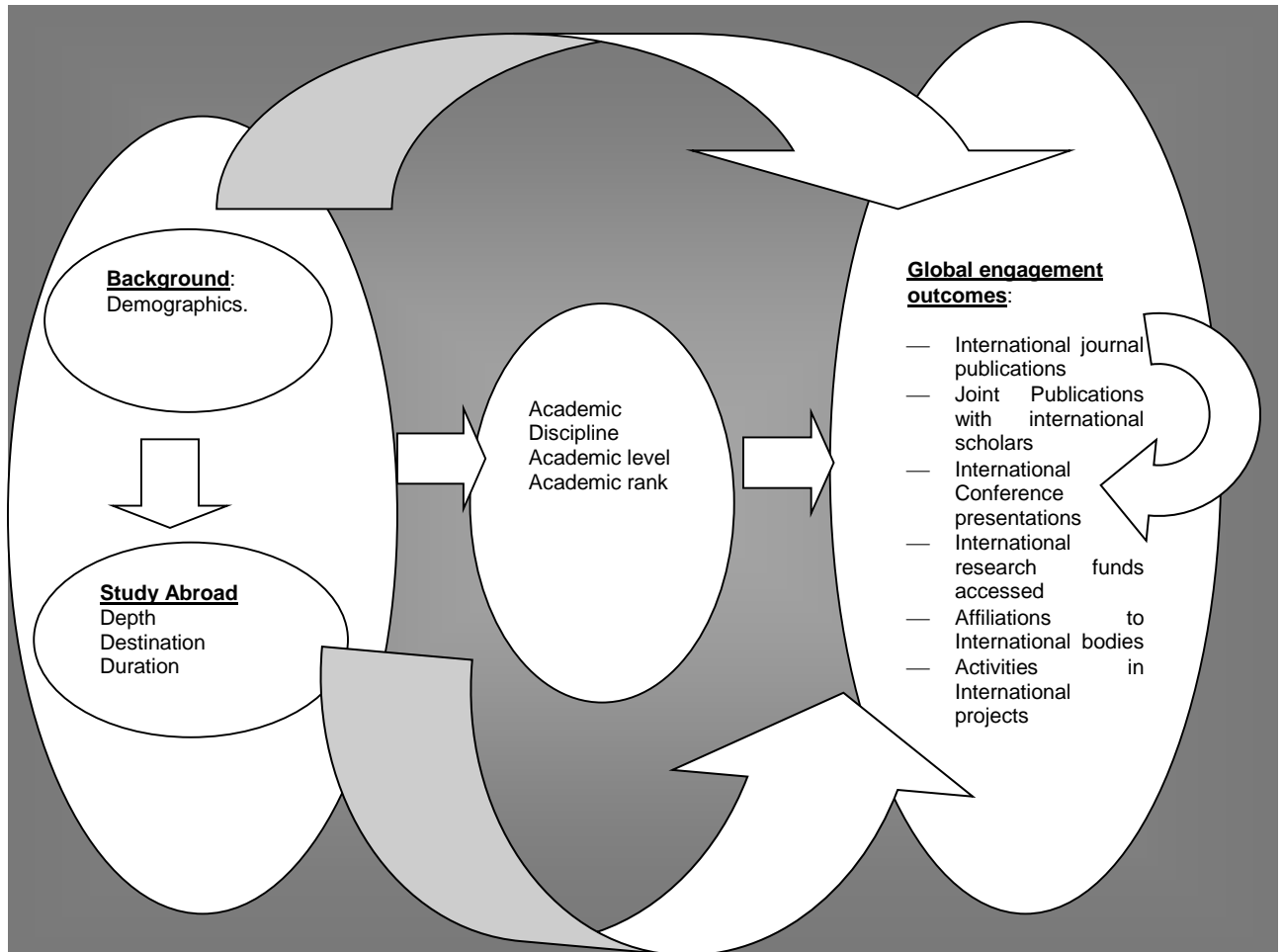
hypothesis however presents a possibility for a null hypothesis that differences in performance would be little expected even when given the advantages of social capital. The assumption of the current study that study abroad graduates with wider social capital would have a competitive advantage despite the world becoming flat. The implication would be that foreign trained doctorates are expected to be more competitive in global research compared to domestic graduates.

### **3.3. The adjusted model**

Consistent with the study abroad for global engagement model, the current study takes the concept of study abroad experience to cover four dimensions; depth, destination duration and demographic factors. On the other hand, the concept of global engagement in research/ concept of internationality or internationalisation of research draws from multi-dimensional definition offered by Brandenburg & Federkeil (2008) and also draws from the review of literature and practices within the study site. It includes indicators ranging from the level of participation in international research projects, sources of third party funding for research, level of mobility for research, level of collaboration with non-nationals and the levels of publishing in international journals. In examining the relationships between the two concepts, the study takes into consideration the implications on the model.

For purposes of the current study, adjustments were made on the global engagement model to accommodate the role of contextual factors; academic discipline, academic rank, education and the individual characteristics. In addition,

the conceptual model of global engagement was replaced with the dimensions of research. With the changes made the global engagement model fits well into the current study. The model indicates that participation in study abroad is likely to impact on global engagement and with the possibility of outcomes being shaped by contextual factors. The model also suggests that while each of the dimensions of study abroad may have a direct influence on the global engagement outcomes, demographics could also have an effect on depth, destination, and duration of study abroad participation and therefore equally affect the outcomes. Although the global engagement model does not indicate mutual influence among dimensions of global engagement, it is however envisaged that some outcomes might also affect the other dimensions of global engagement in research. The adjusted model is illustrated in the diagram below.



*Figure 3.1: The conceptual model for outcomes of study abroad in global research*

### **3.4. Methodology**

The selection of an appropriate methodological approach for the current study assessing outcomes of study abroad is foreshadowed by growing skepticism about existing approaches. Research approaches within the context of study abroad outcomes are not free from criticism. Among the critics of approaches to research in study abroad outcomes is the systematic review of literature that suggests the “lack of clarity, a possible lack of adequate empirical grounding, as well as over-reliance on the same research approaches” (Twombly, Salisbury, Tumanut, &

Klute 2012). Under different designs, research on study abroad outcomes has largely been conducted using quantitative approaches reliant on pre-post studies, surveys, and mixed methodologies combining pre-post or surveys with interview designs. An update on the research approaches on study abroad outcomes covers; quasi-experiments, surveys, mixed methods and existing data provides current patterns in research approaches towards examining outcomes of study abroad.

Quasi-experimental approaches involving fill out questionnaires before and after the study abroad has been a dominant approach to research in the area of study abroad outcomes. The main challenge associated with pre-post studies is the inability to demonstrate whether those students who did not study abroad are unable to realize the same outputs as those who studied abroad (Hadis 2005). Moreover, pre-post studies presuppose the existence of the pre-study abroad scores, which is not necessarily the case in many studies including the current one. In addition, such studies often suffer from small sample sizes which may greatly affect the generalizability of findings. Despite the shortcomings, there have been useful; studies involve changes in reading comprehension (Cubillos et al. 2008), assessing foreign language proficiency outcomes (Savicki 2011), in examining intercultural sensitivity in study abroad programs (Engle and Engle 2004, Medina-López-Portillo 2004). Where it is possible to have pre-exposure scores, pre-post studies remain effective approaches to assessing outcomes. In the absence of such pre-exposure scores, Hadis (2005) proposes a method of

obtaining data retrospectively to compensate for the lack of a comparison group or pretest scores. The suggested approach best suits a survey approach.

Cognizant of the challenges of using retrospective surveys involving questionnaires, the use of comparison data in the absence of a pre-test has been a useful approach. In suggesting the adoption of the comparative approach, Hadis (2005) was in effect advancing an additional aspect to the survey approach. The proposed method complimented other alternative approaches to surveys. Such a case was anticipated by Orahod et al. (2004) using an online survey approach administered through a website to investigate the influence of study abroad on careers. A similar method was used by Murphy et al. (2014) while remaining faithful to the SAGE survey approach examined global engagement with the difference that they included a comparison group. Although surveys enable researchers to get large samples with minimal research costs and time, they also face questions of validity and reliability of self-reported data particularly reactivity effects (Cook & Campbell, 1979). Critics suggest that existing methods for assessment of study abroad outcomes can still be improved (Mohajeri & Gillespi 2008).

Other than quasi-experiments and retrospective surveys, other studies have taken the mixed methods path that combines either of the two approaches with interviews, but none is without challenges. To assess intercultural learning Kang (2014) used both quantitative (surveys, evaluation forms) and qualitative data including; the use of reflective diary entries, incident reports, individual and group interviews, informal ethnographic discussions, participant observation,

photographs/videotapes, field notes, and research portfolios/reports to document the students' experiences. Combining surveys and focus groups were used to assess changes in Intercultural knowledge and competence associated with three different undergraduate science experiences (Bender 2009). Another possible combination involving a questionnaire and interview is also applicable to the assessment of intercultural sensitivity (Fuller 2007). It is the same kind of approach adopted by Paige et al. (2009) to in a study global engagement outcomes. Despite the attractive combination of questionnaires and various qualitative methods, this approach also does not address the problem of reactivity of participants who might be more inclined to give program sponsors a positive feedback. Perhaps, to avoid reactivity effects, researchers might need to utilize existing records.

Fortunately, there is an emerging wealth of data from routine surveys by international agencies but its use for research in study abroad outcomes is still less common. Among known studies are Wiers-Jenssen & Try (2005) and Wiers-Jenssen (2011) which use the Norwegian Institute for Studies in Research and Higher Education (NIFU) Graduate Survey 2002 and Nordic Graduate Survey (2007) to track the labour outcomes of study abroad and the employability of Norwegian mobile and the non-mobile graduates respectively. Norris & Gillespie (2008) also utilized data from a survey by the Institute for the International Education of Students conducted of 17,000 participants of its programs between 1950 and 1999 with the aim of exploring the long-term impact of study abroad programs on future international work. Although this might be considered as existing data, it nevertheless remains survey data and therefore affected by

limitations of self-reported data and challenges of memory that can be selective and decrease over time.

The absence of a control group in the IES alumni study implies that the results cannot infer causation but only correlation. Moreover, longitudinal surveys are further affected by the shortcomings of self-reports and inability to remember details leading to measurement error. Longitudinal surveys are also affected by attrition. In most cases, low response rates during surveys constrain possibilities of obtaining a representative sample. However, existing approaches particularly the use of email could limit coverage and the respondents may not necessarily constitute the population of interest. However, as Norris & Gillespie suggest, surveys can assist inferring association and results could inform advising about study abroad and career planning.

In summary, the quantitative methodology is useful because it allows for the testing of assumed association of study abroad experiences and global research outcomes. The more precise the data, the greater the possibility for more defined estimates of outcomes. While endorsing quantitative methodology, the researcher is also cognizant of the fact that such a choice has implications for the research design and methods. Designs for study abroad outcomes often lay emphasis on the need for a comparison. The importance of comparison could explain the common usage of pre-post designs. Highlighting the importance of a comparison group, Murphy et al. (2014) conducted a follow-up study that sought to improve on the findings of the SAGE project by introducing a comparison group consisting of

contemporaries of those who did not study abroad. Therefore, a study without a comparison group would be questionable. However, many challenges remained unresolved in the choice of methods for study abroad outcomes. In particular, reactivity effects and the problem of missing data arising from non-response are not addressed by the surveys especially in cross-sectional studies.

Few studies make use of longitudinal designs. A study by Rexeisen et al. (2008), is one of the few attempts in longitudinal designs. However, the study aimed at assessing lasting effects of study abroad on intercultural development. Such studies to a greater extent, have a chance at addressing problems of missing data and therefore the importance of utilizing the LCVA data in quantifiable format.

### **3.5. Longitudinal Curriculum Vitae Analysis (LCVA) Method**

In light of shortcomings in existing approaches for assessing outcomes of study abroad, a document study involving a Longitudinal Curriculum vitae analysis method was proposed and explored. The current study involved collecting CVs and applying the principles of content analysis to CVs. Content analysis is a systematic approach to document studies aiming at quantifying predetermined categories in a replicable manner (Bryman 2012). The rationale for using a CV analysis is that retrospective studies are prone to weaknesses of memory especially when seeking factual data spanning years. The CV is identified as one surviving document that summarizes and provides information on the research activities of higher education professionals (Canibano, Otamendi & Andujar 2008).



The CV is, therefore, an enduring record for studies of research engagements and therefore the choice for its adoption for the current study.

Although LCVA is a new aspect to research, CV analysis in itself is not new, and the increasing use in research opens up greater possibilities of non-obtrusive ways of examining diverse research topics. Prior studies serve as an inspiration. CVs have been used for assessing researcher behaviour across many educational aspects that were found to be closely related to the current study. For instance; to assess PhDs trajectories and professional promotion of scientists (Woolley and Turpin, 2007); and inter-sector job mobility (Dietz and Bozeman, 2005; Lin and Bozeman; 2006); and to assess productivity within disciplines (Probst and Lepori, 2007). Others adopted it to address the links between scientific mobility and international co-authorship for Chinese researchers (Jonkers and Tijssen, 2008); impacts of research grants on productivity and careers (Gaughan and Bozeman, 2002; Corley et al, 2003), Researcher collaboration with industry (Bozeman and Corley, 2004; Lee and Bozeman, 2005) and careers analysis and research evaluation purposes (Bozeman et al, 1998). While using CVs, researchers have found and utilized data relating to educational background, year of doctorate, place of education, and publications (Canibano, Otamendi & Andujar 2008, Lepori & Probst 2009). The LCVA method remains unexplored in research. The adoption of the method, therefore, presents new opportunities for research on various dimensions of professional behavior.

In doing the LCVA analysis, data is quantified in a longitudinal format while taking advantage of dated activities. Panel data allows tracking of changes across time and between individuals and groups. The availability of both the cross-sectional and time series data allows the researcher to control for subject-specific effects. Furthermore, those effects peculiar to the period which often constitute a major challenge to cross-sectional survey information in the form of rival explanations are controlled. Considering the advantages, studies exploring study abroad outcomes might potentially answer more questions while addressing more challenges than cross-sectional data generated during the CV analysis. Despite these possibilities, LCVA data had not been explored, and CV analysis is often less utilized in previous studies.

The choice of a LCVA analysis has greater advantage for the current study. It is cost-effective, time-saving, and non-reactive (Sarantakos 2005). As an aspect of document studies, Babbie (2007) argues that the use of content analysis allow studying of processes that occur over time and using unobtrusive measures. Unlike field methods, CVs are stable and therefore permit the correction of errors. Moreover, even potential participants unable to be contacted are still able to participate. The fact that academic CVs are partly standardized is also helpful for the study. The method fits within the financial considerations for the study, and the time frame available for Ph.D. study. CVs, however, tend to lack detail and are prone to coder bias (Dietz et al. 2000) and could further be affected by the self-serving bias of the authors. Coding bias has implications for validity and reliability although it was be minimized through adherence to rules of the coding process. It

is the considered view of the researcher that some of these challenges can be overcome by use of systematic coding methods. Moreover, the self-serving bias in CVs is only speculative.

A coding sheet and coding manual was developed to facilitate systematic coding. A coding sheet was be composed of all the codes and structured for data entry. It will be part of the coding manual that was comprised of the coding procedures and the interpretation of codes and their measurements.

### **3.6. Study design**

Despite the associated problems, retrospective designs are still in common use. Retrospective designs are used for testing hypotheses for possible associations of phenomena in educational and other contexts (Cohen, Manion & Morrison 2007). They are often known by different names including among others; correlation studies, causal-comparative, post facto designs, or quasi-experimental designs (Robson 2011, Shadish, Cook, & Campbell, 2002). In the spirit of the current study, a retrospective design enables the researcher to explore possible causes or influences for the current state of affairs by taking a hindsight view of the past (Dowling & Brown 2010). The approach best suits situations when the researcher cannot select, manipulate or control factors and draw causal inferences. The possibility of hindsight and the absence of manipulation in the current context makes a retrospective design more appropriate for this study.

Retrospective designs, however, are also noted to be weak on causal inference but can be improved by use of a comparison group and taking into account possible rival explanations (Dowling & Brown 2010). A causal inference will be based on the difference between the outcome of the group who received the alleged causal treatment and the results of a group where the alleged cause was absent (Cohen, Manion, & Morisson 2011, Raudenbush 2001, Winship & Morgan 1999). Robson (2011) adds that such a group can even be naturally occurring. Such a possibility provides an opportunity for the use of non-study abroad graduates as a potential source of causal inference in the absence of an experimental control as is the case in the current study. The implication is that the home graduates group constituted the comparison group.

The use of existing data has not been adequately exploited in the past to overcome challenges of previous studies. To overcome limitations of retrospective surveys, the study proposes the adoption of existing data sources which are not deliberately intended for study; Curriculum Vitae (CV) data. This method of data collection is less prone to manipulation and diminish researcher influence. The need to minimize the effects of abrasive methods in studying outcomes also places limitations on the range of data collection techniques and with a bias towards documentary sources. Documentary sources have rarely been used in examining study abroad outcomes and this study explores its use by applying a LCVA analysis to assessing outcomes.

### **3.7. Sample selection and Access**

The data consisting of CVs was drawn from the Uganda National Council of Higher Education Archives for academics that have been in service prior and during the period 2009 to 2014. The choice of the time frame was premised on maximizing the possibility for a larger sample size. Statistical data for the National Council for Higher Education (NCHE) suggests that the population of faculty in higher education has been growing rapidly in recent times and therefore a recent period would yield a large sample than a much earlier period.

The NCHE in regulating higher education institutions in Uganda makes it mandatory for institutions of higher learning in the country to submit CVs of all higher education faculty to the Council for evaluation of the national higher education capacity in the country. The most recent data were presented in 2014 and therefore using this source of data provides a significant number of up to date versions of CVs. Currently, higher education in Uganda has an estimated population of 10,000 academic staff with estimated 1000 having a doctorate. Regarding qualifications requirement for the study sample, the study selected only the holders of doctorates because in Uganda the requirement that faculty conduct research applies only to those with doctorates. With respect to the 2011 statistics, the selection was expected to reduce the sample size to about 1000 and therefore the same number of CVs.

As noted, the study made comparison between foreign and domestic graduates. Academics from countries other than Uganda were excluded from the analysis

because the target for the study is Ugandan faculty who go abroad. Foreign academics are naturally likely to have global engagements even without the study abroad experience, and this would create bias. The omission of foreign academics might further reduce to the target sample, but it could be a minor reduction.

A written request for access, was needed to gain access to and use of CV data in the NCHE archives. The data set was filtered by qualification, nationality, and relevance. None PhD, non-citizens and old CVs submitted before 2009 were excluded as non-relevant. The remaining of 171 CVs was then copied to facilitate the coding and count procedures specified out in the coding manual.

### **3.8. Measurement and Coding**

Measurement and code development followed from the conceptual categories relating to study abroad (explanatory variables) and global research engagement (outcomes). Babbie (2007) suggests that, where theoretical propositions are being tested, the theories should suggest empirical indicators of concepts; and where the researcher begins with empirical observations, the researcher needs to derive general principles and apply them to the observations. The current study begins from theoretical models of study abroad experience and research engagement with their indicators suggested in the literature. Codes were developed in line with the available indicators of study abroad and global research involvement, with minor adjustments.

#### ***Study abroad experience***

For study abroad experience, constructs used in the Study Abroad for Global Engagement study (Paige et al. 2009) and their indices are available and still valid considering the short duration of that study. The constructs are suitable for the current purpose, though they require modifications for certain indicators not appropriate to the current focus. These constructs include destination, depth, duration, and demographics as explained below.

**Destination:** The destination construct for graduates returning from various countries to the USA was utilized. The Global Engagement study used an index generated through the analysis of literature with the aim of measuring cultural differences between student destination countries and the USA. Among the constructs employed in the study included cultural similarity-dissimilarity, cultural distance, and the Human Development Index (HDI). The measurements of cultural similarity-dissimilarity and cultural distance constructs are based on response attitude measures and were, therefore, excluded in the current study. However, the World Bank HDI data (computed by measures of health, knowledge, and standard of living indices) obtained from the World Bank database. Data on destination was captured by country name as a nominal variable and was subsequently linked to the country HDI and thereby transformed into a continuous variable.

**Depth (reflecting the intensity of the experience):** In measuring the depth of study abroad experience, some indicators were adapted from the SAGE study but with minor adjustments. The indices include: studied and worked abroad, studied

abroad in more than one destination, direct enrollment in an overseas institution, had work internship, or field research experience as part of their study abroad, and more than one study abroad experience as an undergraduate. The six constructs constituted an index of depth, and each earned one point in the scoring process. During data coding, the average number of scores for all the six constructs were recorded in the coding schedule.

**Duration of course(s):** Duration indicates the number of months that participants studied abroad for the doctoral course. Although Paige and colleagues chose the most important course, in the event of multiple times abroad, that approach cannot do justice to the current study where research training is expected to have cumulative outcomes. Given the importance of each research course and any additional work experience after the course, the study opted to include all the years spent abroad. The overall length of stay abroad was expected to account for accumulated experience that would impact on research performance. Besides it would include all years of any other relevant training and expertise obtained outside formal qualifications. Therefore, the coding process had to comprise the total number of years for all courses attended as they could potentially provide advantages to an individual.

**Demographic information:** In addition to the counting codes for the outcome variables, demographics of faculty were recorded as the fourth dimension of the study abroad experience. By demographics, Paige and colleagues mean individual characteristics likely to affect outcomes. Following the literature, the variables were



modified to include demographics identified to affect research outcomes. They include multiple features such as gender (male, female), age in years, highest qualifications (doctorate, post-doctorate), academic discipline (humanities or sciences), and research experience in years, level of appointment (lecturer, senior lecturer, professor) and the type of employing institution (private or public). Given the potential influence of identified characteristics indicated in the literature, individual characteristic was measured and coded to assess as well as control when required for their influence on global engagement in higher education research.

### ***Global engagement in research***

The constructs of global research engagement identified from the literature are operationalized in terms of the number of internationally oriented activities, and the total number of related activities were adopted for indicators. The coding process involved counting the number of occurrences of manifestations of a specific code relating to a variable and recording the observed frequencies into the coding schedule (See Appendix 2). A coding schedule was designed for recording of frequency counts of instances of global research engagement under a specific construct. Below are details for proposed measurements and coding for constructs of global research participation:

Professional trips abroad were measured using the number of conferences attended abroad. The problem with this approach was that professional meetings are excluded, and participation is linked to presenting a paper. In that regard,

activities involving organizing a conference may be not be captured as participation because it is not by itself research but merely facilitating research engagements. For the avoidance of doubt, only the activities of presenting a paper at a conference and not merely attending were on record were considered as research engagement. Coding, therefore, involved identifying and counting the number of conference presentations abroad and documenting the frequency counts.

For publications, the number of international publications was considered to be indicative of the level of global engagement in research. Although the choice of measures might be contentious due to debates about internationality of journals (Buela-Casal, Perakakis, Taylor & Checa, 2006), the current usage remains consistent with the definition of global engagement which involves going beyond international borders. Therefore, articles in journals, books, and reports published in another country were considered as falling within the category of global engagement. The challenge of equivalence presented by weight of publication was addressed concerning practices in other studies. While measuring the productivity of academics KYVIK & Olsen (2008) counted articles in scientific and scholarly journals, articles in research books, textbooks, and conference proceedings, research books, and textbooks, and reports in the preceding period under study. They created an index to take into account the types of publications and co-authorship. Articles were given a value of 1, a book the value of 4 article-equivalents. In cases of co-authorship, the number of points would be divided by 2. This method was adopted with the exception that single authorship would earn two points instead of dividing by two. The aim was to retain the data in count form

for uniformity of the data set. The approach of calculating equivalent values, according to Kyvik (2003) would overcome differences between fields and between individuals scientists are substantially reduced.

Measurement of research collaboration is often done using co-authorship (Kartz & Martin 1997). Bozeman & Corley (2004), argue that the use of co-authorship has the advantages of verifiability, stability over time, data availability and ease of measurement. On the downside of it, they observe that co-authorship is a partial indicator of collaboration, and the practice of authors including honorary co-authors undermines its validity. Despite the weaknesses, it is still a common measure of collaboration. In the context of the current focus on global performance, the number of co-authored publications with international scholars was taken as an indicator of global engagement. International scholars in this context were used to refer to researchers based in another country.

Professional affiliations as an indicator of research engagement are less common and appears to be less problematic. It was assumed that for a given academic, the construct could be measured by the number of memberships to professional bodies with a head office based in another country. Frequency counts represented the number of instances of affiliations per year. However, it also involved verifying addresses of listed professional societies especially those that did not have a national referent.

Access to international research projects as a dimension of global research engagement was coded as the proportion of the number of participations in

international research projects with partners outside the country of origin. The level of engagement was coded as the total number of international research projects that an academic had on record per year. For projects lasting many years, the same project would be counted each year as a specific case of engagement.

The final construct involves the level of access to third party funding. Global engagement is assumed to involve access to funds from organizations that are registered and operate beyond national borders. Again, the funding agency may not be easy to categorize. Some global agencies were locally based and fund research activity. Such international bodies conduct activities within the country but with head offices based abroad. The level of access to global funds was measured by the number of times the researcher accessed third party funding from international partners (including consultancies).

### **3.9. Validity and Measurement**

Results of the analysis would only be valid when key concerns regarding data authenticity and internal validity are addressed. Cohen, Manion, and Morrison (2009) identify some such concerns. Because these data were submitted by institutions that monitor staff performance, the collection of CVs from institutional archives has some advantage in relation to authenticity and credibility as opposed to other sources such as collecting from the Internet or study participants. It can be assumed that the information contained in the submitted CVs has gone through a validation process managed by the administrative hierarchy of the institution.

Therefore, administrative measures minimize concerns over authenticity but do not necessarily address threats to internal validity.

Cohen, Manion, and Morrison (2009) list several threats to internal validity. Of specific relevance to the study are threats emanating from history, maturation, and contamination of the comparison group. The effects of history might arise from researcher characteristics such as appointments, qualifications, years of experience and academic discipline. Maturation effects are expected due to differences in years of research experience. Contamination of the comparison group can occur through joint projects between members of the two groups, and also through returning graduates teaching home students. The observed outcomes might, therefore, be considered an artifact of group characteristics due to selection bias or other factors linked to history, maturation and contamination effects rather than study experiences. Therefore, to obtain valid results about study abroad outcomes potential threats to internal validity posed by qualification differences, the level of appointment, years of experience and developments in the academic disciplines were subject to statistical control.

Approaches adopted by Shadish, Cook and Campbell (2002) were useful in dealing with validity threats. They suggest that the problems in non-experimental designs can be overcome when rival interpretations are known so that the latter can be ruled out by design or measurement. A similar approach is adopted by Murphy et al. (2014). With a comparative study, they sought causal links by identifying and statistically controlling for rival influences such as parental incomes,

languages and previous stay abroad. It was, therefore, necessary to measure relevant characteristics that might lead to invalidity. For instance, potential effects of history were measured as the level of appointment and highest qualification attained. Differentiation in disciplinary activity involved identifying specific disciplinary categories. Meanwhile, maturation was measured as the years of experience. These differences were controlled using statistical methods in assessing the influence of study abroad.

At the same time, further steps involved the use of a large sample size in an attempt to dampen the effects of spurious variables (Tolmie, Muijs, & McAteer 2011). Although effects of using non-experimental designs may not be eliminated, the use of statistical control provides an opportunity for the utilization of a non-experimental design. After all, it has been a common tradition in the assessments of study abroad outcomes. The measures are expected to lead to a more valid study result on the association between study abroad and research engagement outcomes. Unfortunately, it may not be possible to measure levels of contamination, though it was also hoped that a broad cross-section size might dampen the influence of such covariates.

### **3.10. Reliability and Measurement**

Like with validity, issues of reliability would arise during the design of the measurement process, particularly in the designing of the coding manual (Appendix 1). Reliability, as discussed in the current context, relates to stability or consistency of measurement (Cohen, Manion & Morrison 2009). Failure to

maintain reliability threatens to invalidate the data because the archived CVs are not necessarily standardized to meet the specific requirements of the current research. Maintaining coding consistency was important and to overcome the challenge was to sort CVs before coding. The sorting involved removing outdated CVs which did not have data for the period under study, removing non-citizens as non-eligible for the study, and CVs of the same person and submitted to more than one institution.

Data sorting was aided by first developing the coding manual for the study. The manual was useful during the coding process because it contained instructions and coding rules followed (Bryman 2012). CVs that did not conform to the requirements as per the guidelines were excluded.

During the coding stage, a complete listing of categories to be coded, and specifications concerning the interpretation of codes, was developed to enhance consistency of the coding and the entering of data into the coding schedule (Appendix 2). This process was critical in ensuring that all required measurements are feasible, and relevant indicators were included in the code schedule. The process also involved testing for intercoder reliability. Intercoder reliability test was conducted to determine the level to which coding could be replicated. The test was performed using the Test re-test reliability method. In conducting the test the researcher together with an assistant, each coded ten similar CVs. The exercise was done, and a minimum correlation was set 0.5 for each variable. According to Cohen, Manion & Morrison (2009), a Pearson reliability coefficient of 0.5 is

considered adequate for a study. The results of reliability test were documented for each variable coded.

### **3.11. Ethical Implications**

The study draws its ethical basis from the revised British Educational Research Association guidelines for educational researchers (BERA 2004). The envisaged ethical concerns relate to access to information in the archives of an institution protected legally under the Data Protection Act (1998). In doing research involving CV analysis, Canibano, Otamendi & Andujar (2008) undertook an oath so as to obtain access to the data. In the same way, the researcher sought clearance from the management of NCHE regarding access and maintenance of confidentiality in the use of the data for research purposes. Clearance was given, and a written consent given and endorsed by the Executive Director of the NCHE (Appendix 3).

The above is in addition to ethical concerns related to the confidentiality and anonymity of data during storage, processing, and presentation. CVs relate to specific people and ethical failures regarding confidentiality and anonymity might cause psychological harm to the owners and dent the reputation of the responsible institution in the custody of data. The researcher complied with ethical regulations and guidelines on the use of such data. Hard copies of CVs that were obtained and kept under key and lock. CVs were assigned serial numbers so that the data in coding sheet became anonymous and cannot be traced to individual persons without reference to a specific CV copy bearing the serial number.



Fear over potential ethical violations were minimized at the data presentation stage because only aggregated forms of data are involved. Furthermore, the study does not make any claim regarding the quality of research engagements, but only the degree of engagement and therefore any findings have no potential of offending the integrity of higher education faculty. The study takes the position that research engagement whether domestic or global has no necessary implications for research quality. Also, the data contained in the CV is assumed to be a true representation of individual performances and no attempt was made to challenge the existing record. As a result, there are no direct ethical implications for the owners of the CVs in as far as their research performances are concerned.

### **3.12. Study timetable**

The study commenced with proposal writing from October 2014. It was expected to progress according to schedule following the upgrade in June to the next phase, by starting with data collection and coding in July 2015. However, adequate data was only realized in January 2016. Coding, therefore, continued up to March 2016. Following completion of the coding process data was analyzed and presented by research question. The whole process was complete by May 2016. Writing the discussion sections of the chapters continued up to 15<sup>th</sup> July 2016. The draft thesis was complete by 30<sup>th</sup> July 2016. Revision and proofreading took place from July to August 2016. Final formatting was complete by the end of August 2016 and the final thesis was ready for submission by September 2016.

### **3.13. Conclusions**

On the basis of a knowledge gap, and the need to promote study abroad with evidence-based outcomes using innovative and valid methods, the proposed study aimed at examining the extent to which global research engagement is affected by study abroad experiences using a LCVA method. The study was conducted within an 18 months period, under non-experimental conditions. It was carried out within the context of Ugandan higher education research because it is a country with historical links to study abroad, and a nation committed to developing its higher education research capacity currently facing shortages. Using quantitative analysis techniques, the study examined questions regarding: the relationship between research engagement and the study abroad experience, With the increasing popularity of study abroad, the findings have the potential to contribute to understanding of the dynamics of global research and the contribution of study abroad with a view of enabling appreciation of the importance of study abroad in national development strategies. It could a long way not only in promoting study abroad but demonstrating strengths that make study abroad an education choice for many countries.

## **Chapter 4 : Data characteristics and Analysis**

### **4.1 Introduction**

The study aims at assessing the outcomes of study abroad among doctoral graduates and it also involves identifying specific factors linked to changes in outcomes. The data was a result of numeric coding of 170 CVs for the period of six years ranging from 2009-2014 and consisting of 129 foreign doctorates and 41 domestic doctorates. It was coded by number as per year for each CV. The data contains individual characteristics of academics, and the three factors of study abroad; depth, duration, and destination as contained in the CVs. Additional information consists of the numerical count variables for the six dimensions of global engagement in the research. Data was described by the sample characteristics and each variable characteristics examined. The global engagement in research as a variable was a generated variable with discrete outcomes.

The chapter begins with a description of the sample characteristics and also includes a description of samples by age and experience to ascertain comparability of groups. The descriptions followed data features that assessed distributions of outcome variables, multicollinearity, and missing values.

### **4.2. Sample Characteristics by award type**

Among the target variables, five individual characteristics were categorical variables. They include; gender, education level, academic rank, academic discipline, and award category. The table (Table 4.1) shows the number of faculty

CVs according to categories. The figures in the cells represent the number of CVs obtained for each specified faculty category.

Generally, there were more foreign doctorate holders compared to domestic doctorate holders in each category of the sampled CVs. The female were few; only 39 CVs compared to 139 males and with the domestic category being very low with 09 CVs. Similarly, the postdoc category was equally low with 31 CVs compared to 149 Ph.D. and with the domestic category having only 06 CVs. The low CV counts further affect the professor category when all academic rank categories and examined. Professor CVs were only 04 for the domestic faculty.

Table 4.1 Number of CVs by faculty characteristics and degree award (n=170)

Variable	Category	Domestic	Foreign	Total
Gender	Male	32	99	139
	Female	09	30	39
	Total	41	129	170
Education level	PhD	35	114	149
	Postdoc	06	15	31
	Total	41	129	170
Academic discipline	Soft	27	65	92
	Hard	14	64	78
	Total	41	129	170
Academic rank (Merged categories)	Lecturer	26	87	113
	Professor	15	42	57
	Total	41	129	170
Academic rank (All categories)	Lecturer	18	49	67
	Senior lecturer	08	37	45
	Associate Professor	11	23	34
	Professor	04	20	24
	Total	41	129	170

A corresponding cross tabulation was done so that the frequency of observations for faculty were computed across the six years under study (2009-2014). The total number of times the observations for a specific category were made as per the

data and their respective percentages computed for each respective category. The details of categories were tabulated (Table 4.2). Consistent with the number of CVs, female faculty and postdoc categories still had low counts on observations. Female faculty with domestic doctorates had 44 observations and professors under domestic category only had 24 observations.

Table 4.2: Observations by sample characteristics and degree award (N = 795).

Variable	Category	Domestic (N)	Foreign (N)	Total (N)
Gender	Male	170 (23.84)	543 (76.16)	713
	Female	44 (21.36)	162 (78.64)	206
Education level	PhD	186 (22.99)	623 (77.01)	809
	Postdoc	28 (25.45)	82 (74.55)	110
Academic discipline	Soft	140 (27.78)	364 (72.22)	504
	Hard	74 (17.83)	341 (82.17)	415
Academic rank	Lecturer	128 (21.99)	454 (78.01)	582
	Professor	86 (25.52)	251 (74.48)	337
Academic rank (All categories)	Lecturer	88 (26.43)	245 (73.57)	333
	Senior lecturer	40 (16.46)	203 (83.54)	243
	Associate Prof.	62 (31.16)	137 (68.84)	199
	Professor	24 (16.67)	120 (83.33)	144
Note: Percentages for the number of observations made for the specific faculty category is in parentheses.				

Assessing by specific groups, the gender categories, females compared to males had few observations. When grouped by award the percentage of female observations turn out to be nearly the same for foreign and domestic awards. Even among the males, the percentages were almost the same. Therefore, within each gender category, the group percentages for foreign and domestic faculty were not very different.

Under the education level categories, postdocs had quite a small number of only 110 observations compared to faculty with Ph.D having 809 observations. Further

assessment showed that among postdocs, there were low percentage differences between the foreign doctorates and domestic graduates in the sample. In the Ph.D. category, the observed difference was small and the same as in the postdoc category. Therefore, in terms of education, the comparison group had fewer observations especially for postdocs.

In the initial data capture, academic disciplines covered twelve categories which included; Agriculture, art design, economics, education, environment, health, humanities, management studies, science, social science, veterinary, and technology. The disciplines were merged into two categories; the hard and the soft due to the inadequate observations within the categories. Data showed that when grouped by the type of award, foreign doctorates had fewer observations than domestic doctorates in the soft disciplines. However, in the hard disciplines, the foreign doctorates had a higher percentage compared to the domestic doctorates. The main difference between the award categories in the sample was therefore in the disciplinary categories. The foreign category being dominant in the hard disciplines and the domestic category was dominant in the soft disciplines.

On academic rankings; four groups were initially captured in the coding process. Among them were; professors, associate professors, Senior lecturers, and lecturers. All the categories were in the range of 20-30 percent. The details showed that the lecturers were the majority, followed by professors, then senior lecturers and the smallest group was the associate professors. When grouped by award type, the professors, and senior lecturers had more foreign than domestic

doctorates. On the other hand, the associate professor and lecturers had more doctorates from national institutions than the foreign doctorates.

Observations by academic ranks were also grouped into two to manage potential shortcomings arising from low category counts. Data on academic ranks was merged into two categories consisting of professors and lecturers. The grouping, when analyzed, showed the percentage of the lecturer category to be larger than the professor category. When grouped by award type, the percentage of foreign was much higher than domestic among the lecturers. Among the professors, the proportion of domestic was far greater than the domestic graduates.

#### **4.3. Sample characteristics by age and experience**

The sample characteristics were further analyzed to determine whether the two groups were the same in terms of age and experience (academic age) before inferential statistics. The categories examined included; education level, gender, academic discipline, academic rank, and Ph.D. award category. The results of the summary statistics are presented below.

Table 4.3 Sample characteristics by mean age and experience (N = 795).

Variables	Categories	Age		Experience	
		Mean	SD	Mean	SD
Education level	PhD	49.9	8.4	10.8	9.0
	Postdoc	49.2	9.8	11.8	7.4
Gender	Male	50.1	8.6	11.0	7.2
	Female	48.8	8.3	10.5	8.0
Academic discipline	Soft	50.6	8.7	11.5	7.5
	Hard	48.9	8.3	10.6	7.3
Academic rank	Lecturer	46.5	7.0	8.3	5.4
	Professor	55.6	8.1	15.3	8.2
Award category	Domestic	50.7	8.0	9.6	6.7
	Foreign	49.6	8.7	11.3	7.5
Notes	SD = standard deviation				

The summary statistics for the sample characteristics on both age and experience suggest that across categories of education, gender, academic discipline, academic rank and award type, the sample had a large dispersion of scores as indicated by large standard errors (Table 4.2). The large standard errors across the subgroups also suggest that the older and the more experienced faculty were distributed across the groups. The mean scores for age and experience had small differences between the lecturers and the professors with a mean difference in age of more than 09 years and the experience of more than 07 years.

#### **4.4. Data characteristics for predictor variables**

Other than the individual characteristics, three factors associated with study abroad experience were measured and below is a summary of the data as represented in (Table 4.3).

##### ***Faculty age***



A summary age variable showed high levels of variability with suggestions of positive skew (Table 4.3). Age had a mean of 49.1 and had a significant variance between individuals estimated at 8.7. The suggestion being that faculty numbers decrease as age increases especially after the age of 50. The large positive standard error suggests that there was faculty who were much older faculty in the sample.

### *Time*

The time variable reflects each of the six years under study and selected on the basis of the need to maximize the sample size. The mean and standard deviations in the table do not give useful information but the time aspect becomes more important in the subsequent statistical analysis bearing in mind the fact it involves a panel data set.

### ***Faculty experience***

Experience refers to the number of years after Ph.D. completion. Experience had a mean of 10.2 and had a significant variance between individuals (7.4) and among individuals was equally large (7.4). However, the variation within is small because data was being captured on a yearly basis. The implication is that the number of faculty with longer experiences reduces over time.

### ***Study abroad destination***

The lowest in HDI destination for study abroad graduates was Uganda comparing the HDI of the various destinations. Uganda was the control group consisting of

faculty with domestic doctorates and has a low HDI (0.484). Data on destination showed a high average HDI. The overall variation was quite low even between individuals. The implication is that most of the faculty went to destinations with little variations.

### ***Duration of study abroad experience***

The period spent abroad studying, including work and internships, was considered under duration. The average duration was beyond the normal years of any Ph.D. program (8 years). The overall variance was large (more than three standard deviations) and was even greater between individuals hence suggesting overdispersion in the sample resulting from cases who stayed abroad for much longer periods.

### ***Depth of study abroad experience***

Depth was computed from an index which had a range of values from 0-6. Zero was for the domestic category. Values from 1-6 represented the various depth attributes for foreign doctorates. The average depth was high as it tends towards the maximum value. However, the high average could be a result of high level of variability between individuals and even in the overall sample. The implication is that while a majority could have received a similar experience of depth, a few experienced greater or the full range of depth measures.

Table 4.4 Summary statistics table for numeric variables (N=795).

Variable	Mean	SD (Overall)	SD (Between)	SD (Within)
Id	85.50	49.10	49.22	0
Time	2011	1.71	0	1.71
Age	49.14	8.75	8.77	0
Experience	10.20	7.37	7.39	1
Depth	4.39	1.77	1.77	1.89
Duration	8.47	3.99	4.06	0
Destination	0.75	0.19	0.19	3.04
International Affiliations	1.92	2.66	2.63	0.26
International Collaborations	0.55	1.97	1.69	0.86
International Funding	0.45	1.07	0.99	0.57
International Projects	0.35	1.21	1.08	0.41
International Publications	1.44	2.68	2.00	1.73
International Conferences	0.77	1.99	1.53	1.26
Global Engagement in Research	5.51	7.62	6.89	2.89
Note	SD = Standard Deviation.			

#### 4.5. Characteristics of the outcome measures

The outcome measures were captured in counts. A data summary showed little variation within individual engagements, but more variation between individuals was noted. Moreover in some of the dimensions, the variation between individuals would be nearly the same as the overall variance. The summary results are discussed by variable and also represented in the table (Table 4.2)

##### ***International affiliations dimension***

The affiliation dimension represents the number of memberships in professional bodies abroad. Overall standard deviation for affiliations was at 2.66 and between standard deviation at 2.63 but the within variance was at 0.26 (Table 4.2). Most of

the faculty did not have any international affiliations. A large number had affiliations within the range of 1-5 while a few more were in the range of 6-10. Only very few faculty had affiliations within the range of 11-15 within the six-year period under study. The data has a right skew with a long tail of values, due to the low-frequency counts in the large range of values. The histogram below illustrates the distribution of data on international affiliations (Figure 4.5).

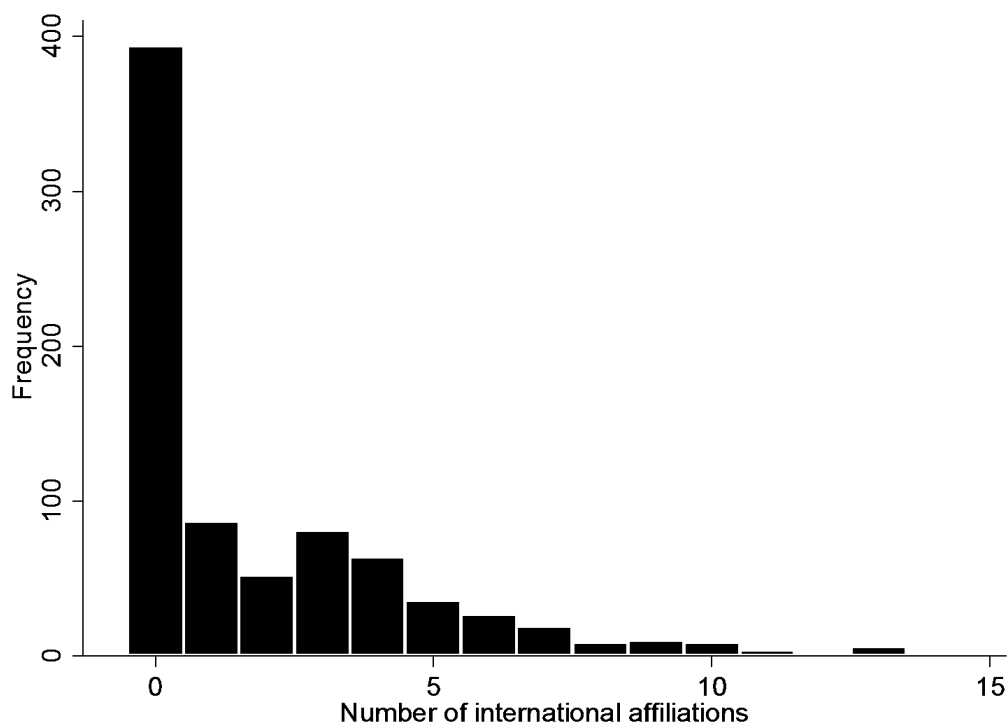


Figure 4.1: Histogram of frequency of international affiliations.

### ***International collaborations dimension***

International collaborations by faculty was determined by counting the number of co-authored articles with international scholars published during the time under study. In collaboration, the between variation was double the within variance at

1.68 and 0.86 respectively compared to the overall variance at 1.97 (Table 4.2). It is clear that data distribution was skewed to the right (Figure 4.6). The highest number of faculty had no collaborations out of more than 600 observations. The remaining faculty had less than five collaborations within the six-year period. There were isolated cases of collaboration within the range of 5-25 incidents accounting for the long tail of observations to the right. The histogram below illustrates the distribution of the data.

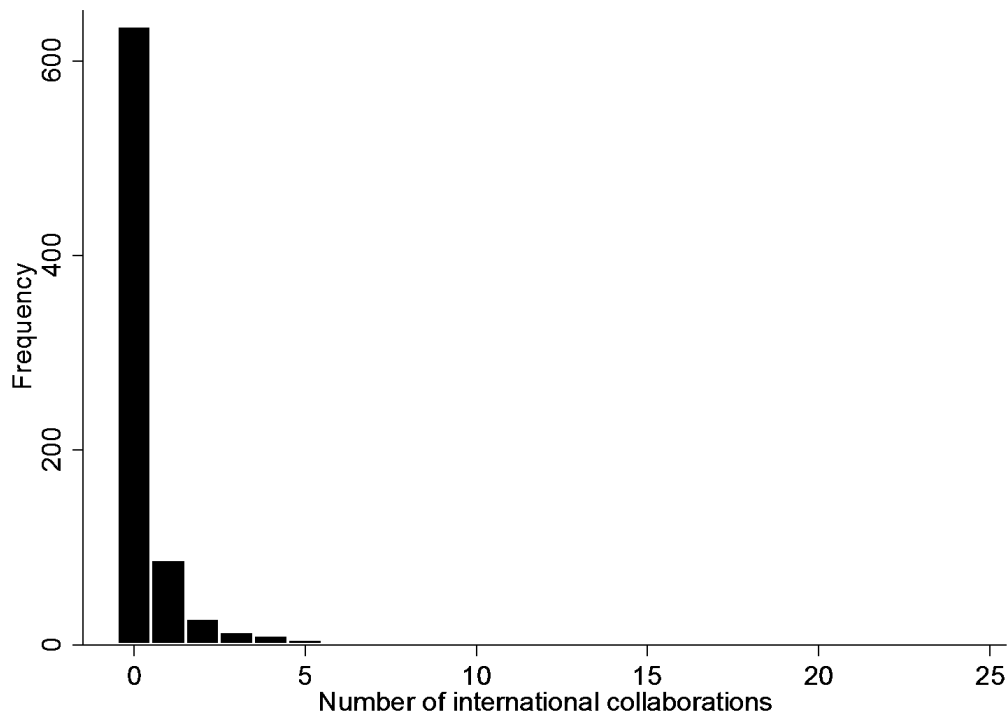


Figure 4.2: Histogram of frequency of international collaboration

### ***International funding dimension***

The funding dimension was data involved counting the number of times that faculty annually accessed international funding. The variation in international financing

scores for an individual during the period was low (0.57) and between and there was a small variation of scores between individuals (0.99). The overall variation of the data was slightly higher than within and between individual variations (1.07) (Table 4.2). The data is skewed to the right, and the range of funding is 0-8 (Figure 4.7). The range of observations was narrow, and the majority of observations suggest that faculty hardly access international funding. Few had a chance of accessing international funds for 1-4 times within the six years. Only very few got more than five times during the period. The histogram below illustrates distribution of the international collaboration outcomes as represented by the histogram.

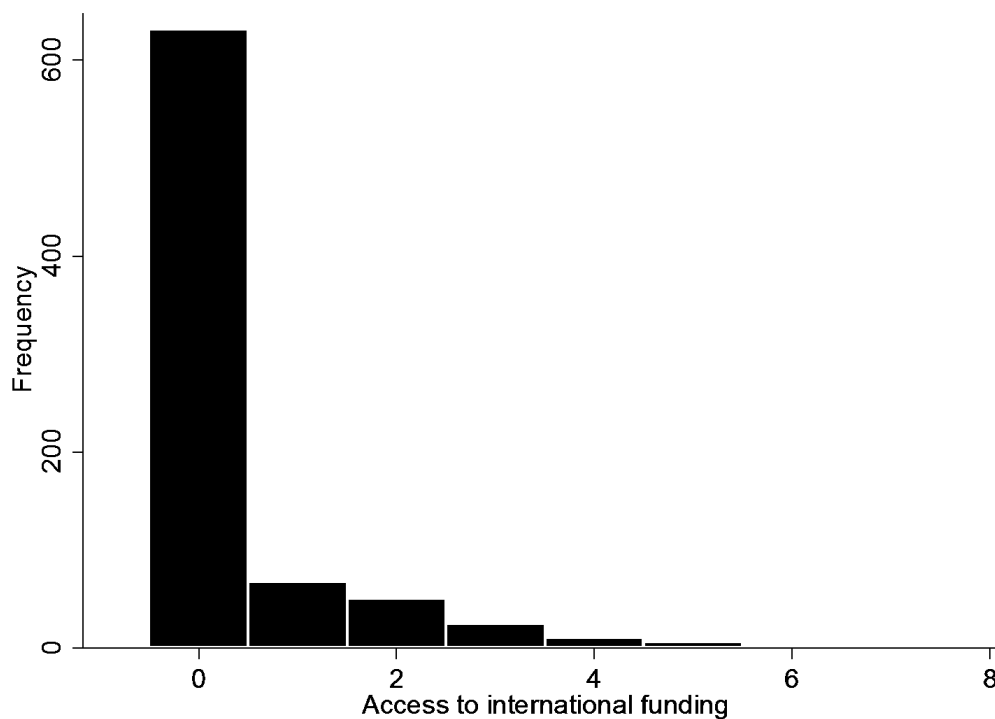


Figure 4.3: Histogram of frequency of access to international funding.

### ***International projects dimension***

Participation in international projects was determined by counting the number of projects that faculty annually during the time of study. Projects also had a low within variation (0.41) compared to the overall and between variations (Table 4.2). The distribution revealed a skew to the right for the data (Figure 4.8). Observations showed a score of zero as the most common and suggesting that most faculty hardly participate in international research projects. There was a small number of faculty accessing international projects within the range of 1-4. Only a limited access was possible within the range of 5-10 and suggesting a long-tailed skew. The figure below is a representation of the distribution of the data under the project dimension.

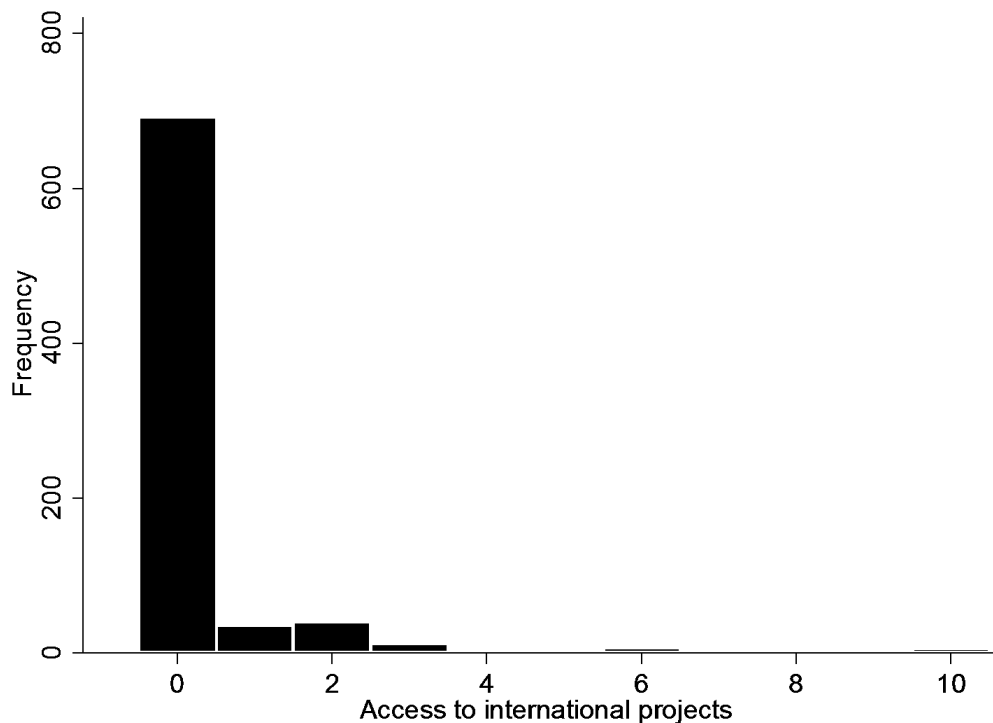


Figure 4.4: Histogram of frequency of participation in international projects

***International publications dimension***

Publications dimension involved counting of cases in international journals for an academic during the years under study. Publication was unique because there was more variation within and between individuals as was the overall variation (Table 4.2). Overall variability was significant (2.68), the variability between individuals (1.99) and the within-individual variability (1.73) was equally large. The major variability suggests skewed data with possible overdispersion. The distribution was also checked using a histogram and the figure below shows a large skew to the right (Figure 4.9). In more than 400 observations, there was no publication. A few published less than ten publications during the period. A few exceptional cases had publications in the range of 10-20 and therefore, the visible overdispersion shown by the long-tailed skew to the right.



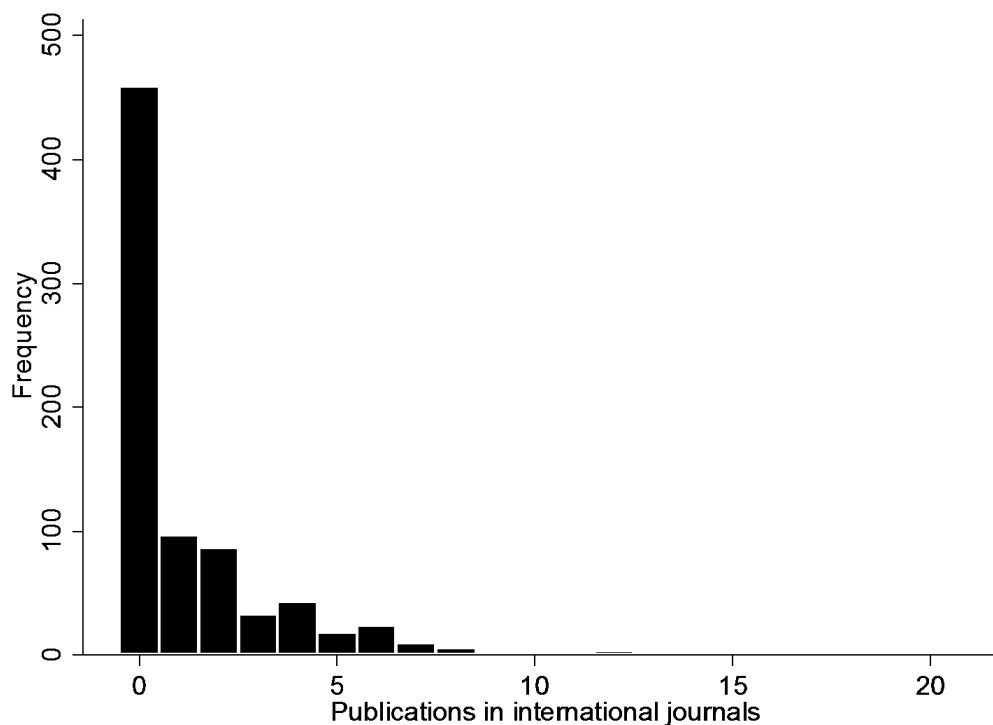


Figure 4.5: Histogram of International journal publications

### ***International conference dimension***

Conference presentations abroad were counted to reflect the level of engagement in the conference dimension. There was more variation within and between individuals as was the overall variation in the conference participation (Table 4.2). The within individual variation was low (1.26) when compared to both the variation between individuals (1.52) and the overall variation (1.98). The overall variation is large and therefore a long-tailed skew would be expected. A histogram revealed skewed distributions as shown in the figure below (Figure 4.10). It further indicates that more than 600 observations had a score of zero and implied no international conference presentations. Very few were in the range of 5-10 and only exceptional

cases within the range of 11-20. The exceptionally low numbers in a large range of values lead to a long right-tailed skew suggesting over-dispersion.

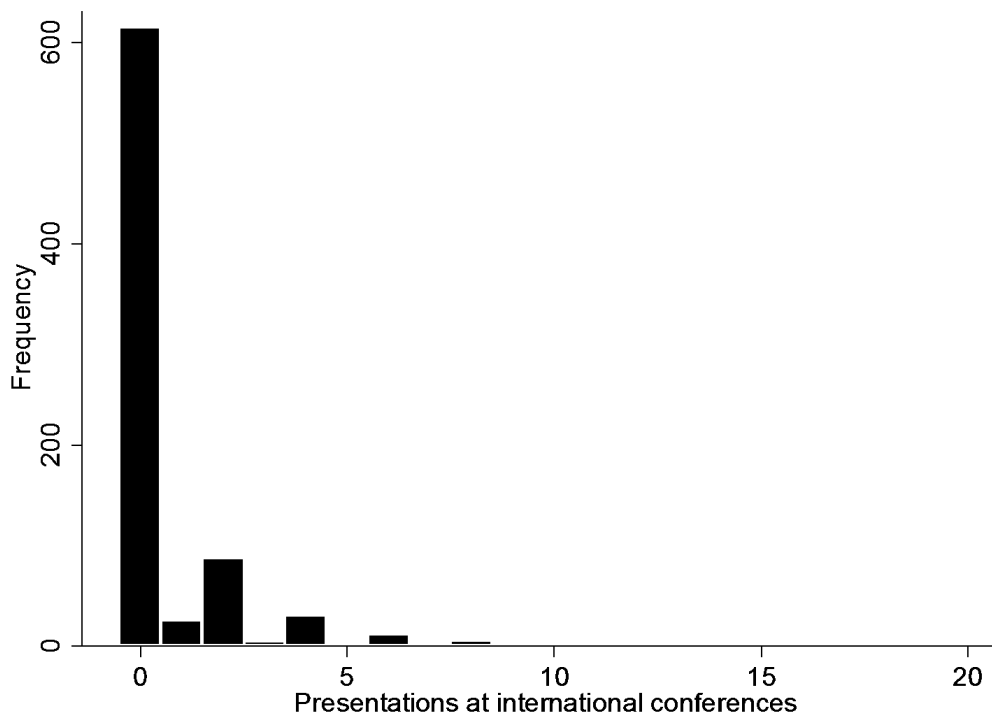


Figure 4.6: Histogram of frequency of international conference presentations

### ***Global engagement in research***

An outcome variable; global engagement in research was generated by combining all the six dimensions of research engagements. The combined variable is a sum of all global activity for an individual per year across the six dimensions. Overall, the summary statistics suggest high levels of variation in outcomes including within the individual faculty and even between individuals. The overall variance was even greater than the mean (Table 4.2). A histogram was generated graphically to assess the distribution of the outcome (Figure 4.11). The figure shows a large

range of engagements from 20-80 but with very low frequency. Such a range presents highly skewed data with a long tail of observations to the right. The implication is that higher rates of engagement are only for exceptional cases, and such cases are very few. It would suggest a typical case of overdispersion considering that a majority of observations were within the range of 0-20. Moreover, observations indicating a zero outcome were the most prevalent.

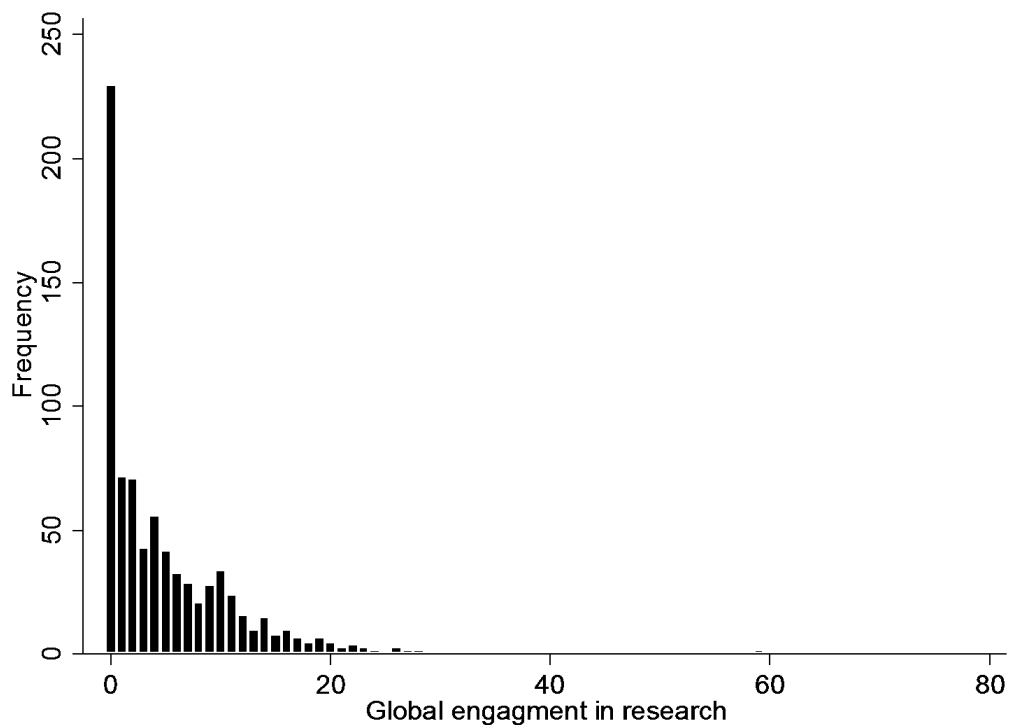


Figure 4.7: Histogram of frequency of global engagements in research

#### 4.6. Correlational Analysis

Data was checked for multicollinearity and results were negative. A pairwise Pearson correlation conducted for all numeric variables in the analysis revealed a low possibility for multicollinearity. Strong correlations were detected between the

main predictor's variables of interest particularly; duration and destination, and duration and depth as well as age and experience, ( $r=0.7$ ) but the correlations were not considered to be strong enough to amount to multicollinearity. Publications and collaboration equally had a strong correlation ( $r=0.6$ ). Conferences and affiliation similarly had a strong correlation ( $r=0.5$ ) and also a fairly strong correlation with publications ( $r=0.4$ ). Moderate correlations were observed between conferences and publication, affiliations, collaboration and funding ( $r=0.3$ ). The rest of the variable combinations either showed a weak or no linear correlation. The threat of multicollinearity was therefore ruled out before any subsequent inferential statistics.

Table 4.5 Table showing correlations among study variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1 id	1.0												
2 Time	-0.1	1.0											
3 Age	-0.1	-0.1	1.0										
4 Exp	0.0	-0.1	0.7	1.0									
5 Dest	0.1	0.0	0.0	0.2	1.0								
6 Depth	0.2	0.0	0.1	0.2	0.6	1.0							
7 Dur	0.1	0.0	-0.1	0.0	0.7	0.7	1.0						
8 Affil	-0.1	0.0	0.0	0.2	0.1	0.0	0.1	1.0					
9 Collab	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.2	1.0				
10 Fund	0.0	-0.1	-0.1	0.1	0.1	0.0	0.1	0.2	0.2	1.0			
11 Proj	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	1.0		
12 Pub	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.3	0.6	0.2	0.2	1.0	
13 Conf	-0.0	-0.1	0.0	-0.1	0.0	0.0	0.0	0.3	0.5	0.3	0.2	0.4	1.0
Notes	Exp = experience; Dest = destination; Affil = affiliation; Collab = collaboration; Proj = projects; Pub = publications; Conf = conferences												

#### 4.7. Missing Values

Missing values are of specific concern to longitudinal studies. As expected from the design stage, the data was unbalanced as a result of missing values. A

descriptive summary of data shows that 76.47% had complete values for all the six years, 4.12% had complete data for five years, 7.06% had complete data for four years, and 12.35% for only three years.

In confronting the issue of missing data, debates concerning the handling of missing values were examined. Of interest in the current study were discourses regarding longitudinal data. Statistical literature within the context of Generalized Estimating Equations (GEE) and Mixed Effects Models (MEM) suggest that when missing data has nothing to do with the treatment effect or outcomes, such data is considered to be missing completely at random (MCAR), and when data is missing due to some observed or unobserved outcomes, data is deemed to be missing at random (MAR) (Ma, Mazumdar, & Memtsoudis, 2012). The MCAR is what is commonly referred to as unbalanced data often a result of study design and does not pose challenges. The MAR is considered a more severe form of missingness and special methodological adjustments are made for this kind of problem. Therefore, understanding the mechanism of missingness was important to determine the course of action for the analysis of the current unbalanced dataset.

The present study which involved the use of archived data for higher education faculty with a Ph.D. and served tenure within the period 2009-2014 was based on the expectation that all data within the period of tenure is captured in CV. Data was submitted and archived as a mandatory administrative requirement, and therefore MAR is technically ruled out. However, two categories of faculty would contribute to MCAR. Faculty who completed Ph.D. and joined service during the period under

study and therefore became eligible for the study would have missing values for the years before they joined tenure. The second category is faculty who submitted CVs before 2014 would also have missing values for the period after the submission. Therefore, study design other than a response to perceived outcomes or unknown reasons were responsible for the unbalanced dataset. By taking missing as MCAR, no attempt shall be made to impose alternative theoretical frameworks to missingness through methodological techniques or adjustments to deal with missingness.

#### **4.8. Data Analysis**

A traditional approach to analysis involving missing values is to impute and fill the missing values because most of the existing statistical methods often led to reductions in sample size by excluding incomplete data. The approach is common especially in regression techniques involving Ordinary Least Squares methods such as repeated measures Analysis of Variance. With advances in analysis of longitudinal data, multiple imputation when data is incomplete is no longer unnecessary. For the GEE method, individuals can join the study at any time of the study but GEE makes use of all the available data for the analysis without excluding incomplete entries. While Mixed Effects Models (MEM) models, automatically impute temporal values in place of missing values, the GEE method assumes that data is MCAR and makes use of only the available data. In the current analysis, therefore, GEE eliminates the need for multiple imputations to fill

up missing data. Aware that current data is affected by the MCAR, the preferred method for data analysis is the Generalized Estimating Equation method (GEE).

The GEE method is one of the popular methods in analysis of longitudinal data and computes population average. GEE was developed in the 1980s, alongside the development of Generalized Linear Mixed-effects Models (GLMM) for incomplete longitudinal data (Liang & Zeger 1986). GEE models often preferred as a method rather than models, extend generalized linear models to the case of correlated data. It is a popular especially for analysis of count outcomes (Gibbons, Hedeker, & DuToit, 2010). GEE models are also termed as marginal models because they help overcome the random effects problem through its averaging procedure. The term “marginal” in this context indicates that the model for the mean response depends only on the covariates of interest and not on any random effects or previous responses (Gibbons, Hedeker, & DuToit, 2010). By using the GEE method, the problem of random effects owing to institutional and disciplinary differences could be overcome when they are of no analytic interest. The GEE is often used when comparing groups and therefore more appropriate because the study compares groups. GEE reproduces the marginal means of the observed data, even if some of those means have limited information because of missing values. The standard errors are adjusted to accommodate the reduced amount of independent information produced by the correlation of the repeated observations over time (or within clusters). Adjustments in standard error enable GEE to compute even samples of a small size.

A few considerations were made before using the GEE method. First, the distribution of the outcome variable was assessed and specified. Based on the observations of the distributions of the dependent variables in shown by histograms. The count variables have limited ranges in outcomes, they had excess zero and the large skew suggest a Poisson or Negative Binomial distributions (Figures 4.5-4.11). Due to the large standard deviations (Table 4.3) greater than the mean, the Negative binomial is more appropriate because the Poisson has a restrictive assumption that the mean and standard deviation are equal (Byers, Allore, Gill, & Peduzzi, 2003). Although the GEE is robust to misspecification of the correlation structure, the QIC was applied using the negative binomial family with a log link function for all the outcome variables to determine a more appropriate correlation structure. The analysis revealed that the independent and in some respects the autoregressive correlation structures were more appropriate structure for all the outcome variables. Robust standard errors (Huber/White Sandwich Estimators; as opposed to conventional standard errors were applied so as to obtain valid estimates in the event of misspecification of the correlation structure (StataCorp, 2003).

Assessing estimates would involve outcomes; in international publications, international collaborations, International projects, International affiliations, International funding, International conferences, and an overall global engagement in research outcome. Given a mean model for a given faculty at a specific time depends on regression parameters, and the variance structure. Given an equation,



it is possible to determine values for parameters of interest by solving for mean. The GEE equation below a viable procedure;

$$g(\mu_{ij}) = \beta_0 + \beta X_{ij}^T + \beta Z_{ij}^T + \mathbf{Time} + \emptyset + e, \quad i = 1, \dots, m, \quad j = 1, \dots, n_i$$

Let  $m$  be the number of clusters,  $n_i$  the number of units in the  $i^{\text{th}}$  cluster,  $i = 1 \dots m$ . Let  $e$  be the within group error,  $\mathbf{Time}$  represents the exposure variable,  $\emptyset$  the selected correlation matrix,  $\mathbf{X}_{ij}$  the vector of covariates of interest,  $\mathbf{Z}_{ij}$  the vector of confounding covariates,  $\beta$  is the parameter estimate a specific variable,  $\beta_0$  the intercept,  $\mu_{ij}$  the conditional mean for the  $j^{\text{th}}$  unit in the  $i^{\text{th}}$  cluster. Let the outcome  $y_{it}$  and  $g$  is the link function for the model. The parameters of interest can be solved by solving for  $g(\mu_{ij})$  being equal to zero.

For each analysis; the parameters of interest and the confounding covariates, the clustering variable, the link function, and the working correlation matrix are clearly stated within the GEE analysis description in the respective chapters.

#### 4.9. Conclusions

The assessment of data characteristics revealed that in all outcome measures, data was count and with a positive skew for all the standard deviations greater than the mean. The data was unbalanced but with no multicollinearity issues detected. The missing value mechanism was assumed to be MCAR. A GEE method was considered appropriate for the analysis of such data. The data characteristics also reveal that the study groups; foreign and domestic are both large and therefore, comparable. Although there were minor imbalances especially

for the foreign doctorates who had more faculty with longer periods following Ph.D., the rest of the groups were normal and were large enough for meaningful statistical inferences. For the outcome measures, all the dimensions had large standard deviations above the mean and skewed to the right. Global engagement variable equally had a standard deviation above the mean. A GEE method was considered appropriate to deal with the unbalanced data and the non-normal distribution. The Negative binomial distribution in particular would be more appropriate than the Poisson distribution due to the large standard deviations in the data. After assessing the data characteristics and making decisions on the analysis, the next chapter examines the first research question for the study.

## **Chapter 5 : Overall study abroad experience and global research engagement**

### **5.1. Introduction**

The chapter uses numerical data from the LCVA method to answer the research question: To what extent is study abroad associated overall levels of global engagement in research following the return to the country of origin? It was guided by the assumption that foreign trained doctorates would have higher levels of global orientation in research compared to domestic, trained graduates. In the baseline model, the extracted LCVA data was analyzed to compare foreign trained and domestic trained doctoral graduates on global research engagements. In the subsequent sections of the chapter, the Generalized Estimating Equation (GEE) analysis procedures are presented. The sections that follow consists of results of various analytical models analyses, a results in summary and a discussion section. In concluding the chapter, the implications and projections for further study are discussed.

### **5.2. The GEE analysis Process**

Prior to the GEE analysis, data was examined with descriptive statistics. The outcome revealed that studying abroad would lead to higher rates of global engagement (Mean = 5.82; SD = 7.99) compared to domestic doctorates (Mean = 4.56, SD = 6.28). For purposes of inference, data was further analyzed using the GEE method.

Prior to the analysis, the count measures of all the dimensions of global engagement in research were summed up into a single outcome variable with a negative binomial distribution. A dummy variable for type of award and consisting of foreign and domestic doctorates was created such that the domestic category was the reference group. The covariate of interest was therefore, the type of doctoral award (foreign/domestic) and the independent correlation structure was adopted.

During the analysis, individual characteristics such as age, gender, and education level were controlled. Additional dummy variables for categorical predictors were also created, and continuous predictors were standardized to ease interpretation. Using the independent correlation structure, the negative binomial model with robust standard errors were applied in the analysis. The GEE is robust to misspecification of the correlation matrix and therefore overcomes any errors related to its selection.

To estimate rate of global engagement in research, the GEE equation provided in chapter 4 of the thesis is applied. The marginal mean global engagement for an individual faculty at a specific time will depend on the doctoral degree award, the age of faculty, experience, gender, academic discipline, academic rank and education level. It will also depend on the constant, the covariance structure, the exposure time and the error term. Taking the mean global engagement to equal zero and controlling for the rest of the variables, the mean of degree award type can be determined by GEE equation below:

$$\begin{aligned}
&g(\text{Global engagement in research}_{ij}) \\
&= \beta_0 + \beta_1 \text{Award type}_{ij} + \beta_2 \text{Age}_{ij} + \beta_3 \text{experience}_{ij} + \beta_4 \text{Gender}_{ij} \\
&+ \beta_5 \text{Academic discipline}_{ij} + \beta_6 \text{Academic rank}_{ij} \\
&+ \beta_7 \text{Education level}_{ij} + \text{Time} + \text{CORR} + \text{error}_{ij}
\end{aligned}$$

Following the baseline analysis, follow-up model analyses were conducted to further explore the categories of outcomes in global research engagement. The analyses involved the GEE method conducted across; education levels, gender, academic ranks, and academic disciplines. The rationale was to gain a more complete understanding of the impact as well as examining its categories. GEE generates population averages in the form of coefficients but were converted into incident rate ratios for ease of interpretation. Therefore rates of global engagement are interpreted to mean engagement rates per year.

### 5.3. Results of the GEE Analysis

The analysis aimed at determining study abroad outcomes on global engagement in research by comparing data of study abroad doctorates and their colleagues with domestic doctorates. Results showed that study foreign doctorates, compared to national graduates would on average, have 1.63 times higher rates of global engagement in research and the difference between the two groups was significant at 0.05 (Table 5.1). Therefore, studying for a doctorate abroad than at home would probably increase rates of global engagement in research for higher education academics.

The analysis also revealed that academic rank has significant correlations with global engagement in research. For instance, professors would have higher rates of global engagement compared to lecturers. Age, experience, gender, education level and academic discipline had no correlation with outcomes on global engagement. The results, therefore, suggest a correlation between pursuing a doctorate abroad and increased rates of global engagement in research, other factors constant. The results in the current form would not provide much information on study abroad links with the categories of global engagement. Therefore, further analyses were conducted further to explore the categories of the association between study abroad and global engagement in higher education research.

Table 5.1: GEE table for study abroad outcomes on global engagement (N=795)

Variable	Rates of global engagement
Foreign doctorate <sup>a</sup>	1.631* (0.356)
Age (standardized scores)	0.805 (0.147)
Years after Ph.D. (experience) in standardized scores	0.869 (0.134)
Gender (Male) <sup>b</sup>	0.960 (0.167)
Education level (Postdoc) <sup>c</sup>	1.476 (0.337)
Academic rank (Professor) <sup>d</sup>	3.471*** (0.726)
Academic discipline (Soft disciplines) <sup>e</sup>	0.679 (0.137)
Notes: Exponentiated coefficients; Standard errors in parentheses Starred = * p<0.05; ** p<0.01; *** p<0.001 a = Category for a dummy variable award with domestic as the reference category. b = Category for a dummy variable gender with female as the reference category. c = Category for a dummy variable education with Ph.D. as the reference category. d = Category for a dummy variable Academic rank with lecturer as the reference category. e = Category for a dummy variable discipline with hard discipline as the reference category.	

#### 5.4. Study abroad and global engagement across education level

In keeping with the need to explore further the categories of the relationship between study abroad and global engagement in research, a secondary analysis was done to examine the categories of the relationship across education levels. The assumption was assumed that foreign doctorates than domestic doctorates would be associated with higher rates of global engagement across education levels. Therefore, in the analysis, data was split by educational attainment so that the Ph.D. and Postdoc levels would be analyzed separately.

#### Descriptive statistics

The descriptive statistics for the relationship between study abroad and global engagement across education categories were examined through their means and standard deviations (Table 5.2).

Table 5.2: Descriptive statistics for outcomes across education level (N=795).

Award	Domestic		Foreign		Total	
Score	Mean	SD	Mean	SD	Mean	SD
PhD	4.40	6.42	5.62	8.13	5.32	7.76
Postdoc	5.64	5.16	7.35	6.69	6.89	6.33
Notes:	SD = Standard Deviation.					

The descriptive statistics showed that foreign doctorates were on average more globally engaged compared to the domestic doctorates within each category of educational experience. Although both categories exhibited high variability, there was greater variability in the scores within the Ph.D. category than in the Postdoc category as seen in the standard deviations.

## **GEE results**

Using the GEE method, a negative binomial with robust standard errors was fitted through xtgee in STATA, the results for each category were examined. GEE revealed differences in associations between global engagement and each of the two categories of education level (Table 5.3). The result showed study abroad would affect doctorates significantly, but the postdocs would have no significant differences among themselves. Foreign Ph.D. graduates would have a significant and higher rate of global engagement (1.65 times) in research than domestic Ph.D. Postdoc with a foreign Ph.D. would have no significant difference with a postdoc with a domestic Ph.D. After attaining postdoctoral training, the differences would reduce to non-significant levels.

New patterns also emerged for the control variables. The analysis revealed that male faculty with postdocs were more likely than females, to be globally engaged. For those with only a Ph.D., there would be no difference between men and women on levels of global engagement. Furthermore, professors as opposed to the lecturers, would on average have higher and significant rates of global engagements for those who only have a doctorate. Outcomes for professors with a postdoc would be expected to increase but not significantly. Age of faculty, years since Ph.D. completion, and the academic discipline would on average have no significant impact on global research engagements for both Ph.D. and postdoc categories. Therefore in addition to a foreign doctorate, Ph.D. graduates compared to postdocs were associated with high levels of global engagement.



Table 5.3: GEE table for outcomes across education levels (N=795)

Variable	Global Engagement rates	
	PhD	Postdoc
Education level		
Foreign doctorate <sup>a</sup>	1.652* (0.393)	1.326 (0.701)
Age in standardized scores	0.799 (0.162)	0.813 (0.202)
Years after PhD (experience) in Standardized scores	0.823 (0.138)	0.997 (0.277)
Gender (Male) <sup>b</sup>	0.880 (0.166)	2.284* (0.764)
Academic rank (Professor) <sup>c</sup>	4.022*** (0.823)	1.332 (0.618)
Academic discipline (Soft discipline) <sup>d</sup>	0.706 (0.158)	0.667 (0.295)
Number of observations	702	93
Notes: Education level is a grouping variable with Ph.D. and postdoc as categories. Exponentiated coefficients; Standard errors in parentheses Starred = * p<0.05; ** p<0.01; *** p<0.001 a = Category for a dummy variable award with domestic as the reference category. b = Category for a dummy variable gender with female as the reference category. c = Category for a dummy variable Academic rank with lecturer as the reference category. d = Category for a dummy variable discipline with hard discipline as the reference category.		

### 5.5. Study abroad and global engagement across gender categories

An additional secondary analysis was conducted to examine the association of study abroad and global engagement across gender categories. The aim was to determine whether the positive outcome of study abroad would remain consistent even within the gender categories.

#### Descriptive Statistics

Below is the outcome on the descriptive statistics that examined the average performance of each group with a gender category (Table 5.4).

Table 5.4: Descriptive statistics for engagements across gender categories (N=795)

Award	Domestic		Foreign		Total	
Score	Mean	SD	Mean	SD	Mean	SD
Female	4.97	4.70	4.29	4.54	4.43	4.57
Male	4.46	6.61	6.31	8.78	5.84	8.31
Notes	SD = Standard Deviation.					

Foreign doctorates among females were less globally engaged than their domestic trained counterparts. The standard deviations were nearly the same. However, the males were on average, almost twice more likely to be globally engaged than their domestic trained counterparts.

### **GEE results**

The GEE secondary analysis was conducted to examine the impact on gender categories while controlling for other covariates. The aim was to test the assumption that foreign doctorates would be more globally engaged than their domestic counterparts across female and male categories. Once more data was split into female and male categories so as to compute the impact on each category independent of another category.

The outcomes were different for both categories (Table 5.5). On the average, study abroad is appears to empower males than females. Men who studied abroad were 1.82 times more likely to be more globally engaged than their domestic counterparts. Males would more likely increase global engagement for the country when offered the chance to study abroad. Female doctorates from abroad were more likely to be globally engaged than domestic colleagues, but their differences

were not significant. The result implies that while study abroad made a big difference for male faculty, study abroad made no difference among female faculty in terms of a global orientation to research. The result signifies variation in study abroad outcomes for female and male faculty with the males being linked to significant study abroad outcomes than the females.

Among the control variables, significant differences still emerged following the split analysis of the data by gender. For both male and female faculty, global engagement rates would have no significant changes given an increase in years after graduation. Even in education level and academic disciplines there were no significant differences among men and no difference in global engagement rates among females. Similarly, age in the current analysis has no implications on outcomes across both male and female faculty. However, within the academic ranks, the impact was nearly the same. It emerged within in each gender category, professors would have significantly higher rates of global engagement than lecturers. Therefore, current approaches to studying abroad have positive global engagement outcomes among males than females, and their results could further be enhanced through postdoc studies.

Table 5.5: GEE table for outcomes across gender (N=795)

Variable	Global Engagement rates	
	Female	Male
Gender		
Foreign doctorate <sup>a</sup>	1.255 (0.374)	1.824* (0.487)
Age in standardized scores	0.918 (0.203)	0.764 (0.170)
Years after PhD (experience) in standardized scores	0.630 (0.183)	0.944 (0.166)
Education level (Postdoc) <sup>b</sup>	0.751 (0.255)	1.631 (0.410)
Academic rank (Professor) <sup>c</sup>	3.164** (1.236)	3.550*** (0.849)
Academic discipline (Soft discipline) <sup>d</sup>	0.785 (0.224)	0.660 (0.160)
Number of observations	186	609
Notes: Gender is a grouping variable with female and male as categories. Exponentiated coefficients; Standard errors in parentheses Starred = * p<0.05; ** p<0.01; *** p<0.001 a = Category for a dummy variable award with domestic as the reference category. b = Category for a dummy variable education with Ph.D. as the reference category. c = Category for a dummy variable Academic rank with lecturer as the reference category. d = Category for a dummy variable discipline with hard discipline as the reference category.		

## 5.6. Study abroad and global engagement across academic ranks

The study further sought to examine the degree to which study abroad was associated with outcomes of global engagement within the academic ranks. The analysis involved professor and lecturer categories.

### Descriptive Statistics

The outcomes were first examined with descriptive statistics as indicated in the table below (Table 5.6).

Table 5.6: Descriptive statistics for engagements across academic ranks (N=795)

Award	Domestic		Foreign		Total	
Score	Mean	SD	Mean	SD	Mean	SD
Lecturer	1.94	3.11	4.43	5.50	3.88	5.17
Professor	7.95	7.60	8.33	10.75	8.22	9.94
Notes	SD = Standard deviation.					

Among the lecturers and the professors, foreign doctorates were more globally engaged than domestic, trained graduates. Foreign doctorates in each category were above average in each category. However, each category had a large standard deviation compared to the domestic doctorates.

### **GEE results**

The GEE once again indicated that study abroad outcomes were non-uniform for the professors and lecturers. The results revealed that study abroad outcomes would be more pronounced among the lecturers than among professors. In the lecturer category, the results for a foreign doctorate significantly increased 2.46 times higher when compared to a domestic doctorate but in the professor category, differences would be non-significant (Table 5.7).

Among the control variables, global engagement would only be associated with education level for lecturers. Having a postdoc would positively and significantly correlate with global engagement in the lecturer category. Other outcomes had no significant links with study abroad. For instance, lecturers in the soft disciplines compared to lecturers in the hard disciplines had no significant difference in global engagement rates. Even among academic ranks, outcomes for the professor

category had no significant correlation with either education level or academic discipline. Also, age, years following Ph.D. and gender had no association with changes in levels of global engagement for faculty. Therefore, other than the connection with study abroad, changes in average global engagement in the model would only be related to education level among the lecturers.

Table 5.7: GEE table for outcomes across academic ranks (N=795)

Variable	Global Engagement rates	
	Lecturer	Professor
Academic Rank		
Foreign doctorate <sup>a</sup>	2.459*** (0.629)	1.095 (0.320)
Age in standardized scores	0.877 (0.130)	0.837 (0.280)
Years after PhD (experience) in Standardized scores	0.771 (0.162)	0.914 (0.205)
Gender (Male) <sup>b</sup>	0.914 (0.194)	1.162 (0.349)
Education level (Postdoc) <sup>c</sup>	1.849* (0.515)	0.911 (0.385)
Academic discipline (Soft discipline) <sup>d</sup>	0.649 (0.144)	0.721 (0.287)
Number of observations	497	298
Notes: Academic rank is a grouping variable with lecturer and professor as categories. Exponentiated coefficients; Standard errors in parentheses Starred = * p<0.05; ** p<0.01; *** p<0.001 a = Category for a dummy variable award with domestic as the reference category. b = Category for a dummy variable gender with female as the reference category. c = Category for a dummy variable education with Ph.D. as the reference category. d = Category for a dummy variable discipline with hard discipline as the reference category.		

### 5.7. Study abroad and global engagement across discipline categories

In the final section of the chapter, the aim was to compare the performance of foreign and domestic doctorates across hard and soft disciplines. The analysis compared foreign doctorates and domestic doctorates within each of the

disciplines. The guiding assumption was that study abroad would be more globally engaged than domestic graduates in both groups.

### **Descriptive Statistics**

The descriptive statistics compare group average performance for the hard and soft disciplines (Table 5.8).

Table 5.8: Descriptive table for engagements across academic disciplines (N=795).

Award	Domestic		Foreign		Total	
Score	Mean	SD	Mean	SD	Mean	SD
Hard	4.84	6.49	7.52	9.92	7.01	9.41
Soft	4.41	6.18	4.28	5.28	4.32	5.55
Note	SD = Standard deviation.					

In the hard disciplines, the foreign doctorates were on average more globally engaged within the hard disciplines than in the soft disciplines. Within the soft disciplines, they performed less than the domestic doctorates. There was a comparatively larger standard deviation in the hard disciplines suggesting outliers which could affect scores.

### **GEE results**

When other covariates were controlled within the context GEE method, the foreign doctorates had a significant comparative advantage in global engagement over domestic doctorates within the soft disciplines but had no significant difference within the hard disciplines despite objective differences still in their favor (Table 5.9). Foreign doctorates in the soft disciplines, were on average 1.73 times more globally engaged than their domestic colleagues. Therefore, greater benefits in

global orientation in research would on average be expected among foreign-trained faculty in the soft disciplines. No significant differences would be expected among faculty in the hard disciplines on the basis of where the doctorate was obtained.

The analysis also showed that some of the control variables were more associated with global engagement rates than others. Academic ranking would be related to outcomes irrespective of the discipline. Professors compared to lecturers would be linked with increased rates of global engagement no matter the discipline. However, other variables would only affect either the hard or the soft disciplines. For instance; age in a significant way negatively affected global engagement in the soft disciplines but no significant differences in the hard disciplines. On the other hand, postdocs within the hard disciplines would have significantly higher global engagement rates compared to Ph.D. graduates within the same disciplinary category. No significant differences were linked to education level were found within the soft category. The number of years after Ph.D. and gender had no correlation with outcomes on global engagement. On average, wider differences in rates of global engagement would be more likely in the soft disciplines than in the hard disciplines. For the hard disciplines, a postdoc study would significantly enhance rates of global engagement. However, no specific location of postdoc destination is suggested by the results.



Table 5.9: GEE table for outcomes across academic disciplines (N=795)

Variable	Rates of global engagement	
	hard	Soft
Academic discipline		
Foreign doctorate <sup>a</sup>	1.767 (0.779)	1.733* (0.435)
Age in standardized scores	1.148 (0.368)	0.602*** (0.082)
Years after PhD (experience) in standardized scores	0.716 (0.169)	0.991 (0.181)
Gender (Male) <sup>b</sup>	1.185 (0.317)	0.850 (0.203)
Education level (Postdoc) <sup>c</sup>	1.653* (0.412)	1.139 (0.424)
Academic rank (Professor) <sup>d</sup>	2.447** (0.835)	4.635*** (1.054)
Number of observations	352	443
Notes: Academic discipline is a grouping variable with hard and soft disciplines as categories. Exponentiated coefficients; Standard errors in parentheses Starred = * p<0.05; ** p<0.01; *** p<0.001 a = Category for a dummy variable award with domestic as the reference category. b = Category for a dummy variable gender with female as the reference category. c = Category for a dummy variable education with Ph.D. as the reference category. d = Category for a dummy variable Academic rank with lecturer as the reference category.		

## 5.8. Discussion

The chapter aimed at examining the link between a doctorate abroad and global engagements in research. The assumption that foreign trained doctorates would have a more global orientation than domestic doctorates guided the analysis. As expected, the study supports the hypothesis that foreign doctorates would have high rates of global engagement in research than domestic doctorates. The outcomes were significant for Ph.D. but not among postdocs, among males than among females, among lecturers but not professors and finally within the soft and not the hard disciplines.

Overall, the analysis suggests that a doctorate abroad is an impactful experience in later career engagements. The findings are consistent with early studies suggesting the positive impact of study abroad (Paige et al. 2009). Arguments that study abroad graduates exhibit; higher levels of functional knowledge relating to life in other countries, knowledge of global interdependence, cultural diversity and world geography (Sutton & Rubin 2004) echo well with the current study. The advantage of functional knowledge could be further reinforced by the findings that study abroad graduates have higher levels of contact abroad than those who studied in their home countries (Kyvik & Larsen 1994). It is, therefore, possible for foreign doctorates to tap on their functional knowledge about other nations and the contacts abroad to build their global research engagement profiles. In particular, they could make use of their former doctoral colleagues from different parts of the world to access information regarding opportunities in other countries. Also, they may continue having contacts with their former supervisors and tutors in the country where the doctorate was obtained. Furthermore, they enjoy information advantage through continued access to libraries, mailing lists for alumni, and membership in professional societies abroad. These continue providing support and links to a wealth of information and social capital through alumni. Therefore, while the graduates return to the countries of origin, they remain connected to the social networks in countries where they studied, and the linkages are an important aspect of the transformation process. While it would be easy to appreciate the overall relationship between study abroad and global engagement, some of the outcomes are quite surprising and sometimes disturbing. In particular, the absence

of difference among postdocs, professors, and females is astonishing. There could be no general explanation covering the three categories.

A few studies attempt to examine the impact of a postdoc on research outcomes for graduates with various doctoral award types. Compared to previous studies, however, the current analysis goes a step further and compared postdocs with a foreign doctorate alone and also those with a doctorate only. The findings showed no significant difference. Shin & Cummings (2010) argue that postdoc training was common in engineering, natural sciences, and medical and health sciences, but rarely in the social sciences and arts and humanities. There was little variance among faculty in the hard disciplines, and they argued that many Ph.D. holders in the sample had experienced post-doctoral training. The postdocs in the Social Sciences were more productive than their peers without the experience. The comparison in their study was between foreign and domestic doctorates and not between same qualifications; postdocs only or Ph.D. only. The reason for the difference in the current study could be explained by the fact that postdoc training for Ugandan academics is often done abroad. A good example is an existing program with the University of Cambridge that allows a large number of Ugandan academics to do a postdoc at Cambridge University in the UK. Therefore the advantages of a doctorate abroad are neutralized by faculty who had no doctorate abroad. While few studies have examined this aspect, it is of importance to note that a postdoc often provides greater opportunities for interactions with peers and joint research than a doctorate which often turns out to be more of a lonely research experience with the guidance of a supervisor. The implication is that

faculty in low-income countries especially Uganda, might still benefit more through postdoc studies abroad even when faculty have domestic doctorates. After all, results suggest that in the hard disciplines, it might suffice for faculty to pursue a postdoc or a Ph.D. abroad. Following a Postdoc, even domestic doctorates could become more globally engaged foreign Ph.D. (Table 5.5), and moreover, no significant difference was found between postdocs with foreign and domestic doctorates (Table 5.2). However, given the small number of postdocs in the sample, there is still need for caution and avoid the rush to substitute Ph.D. abroad with a postdoc. There is a need for further study to examine this aspect.

Research on productivity among academics suggests the importance of academic rank in accounting for differences (Rosterd & Arknes 2014). There is little literature that would account for variation in global engagements among professors within award categories; foreign and domestic. The significant difference between foreign and domestic Ph.D. is in tandem with the expectations of study abroad outcome. Many studies have come up with suggestions that productivity is affected by age (Kyvik 1990), and therefore such explanations could lend credence to the lack of difference among the professors. However, age alone cannot explain the difference because the two categories are both productive. A more convincing explanation could be found by considering duration since Ph.D. It could be argued that many of them completed their doctorates abroad much earlier than the lecturers and through decay, they have since lost the advantages of having studied abroad. Moreover, the current study equally examined and found support for the generational decay assumption. On the other hand, many of them could have

already done a postdoc abroad and therefore overcome differences associated with study abroad. One or both arguments could provide valid explanations for the lack of significant difference in the global engagements of foreign and domestic trained doctorates who have attained professorship. Nevertheless, given no significant difference within the professor ranks, the differences between foreign and domestic doctorates were only substantive.

Discussions concerning differences in overall productivity among disciplines are common in research. Academic disciplines have variations especially in respect to research productivity, and such variations may also be reflected in levels of global engagement in research. The view that the hard disciplines are more standardized than the soft disciplines and that the soft disciplines tend to be context oriented and therefore have context bound implications have been pointed out in studies on academic productivity (Kyvik and Smeby 1994). Shin & Cummings (2010), also argue that research in the soft-sciences, often requires greater effort, and there is little agreement on theory and perspectives compared to the hard disciplines. Given such disciplinary variations, the implications on rates of global engagement are easy to comprehend. The standardization in academic disciplines would have consequences that global engagement is a given for the hard disciplines so that research outcomes could easily be shared on a worldwide basis with less regard for the context. Opportunities, to publish in international journals, collaborations and participation in international projects are opened by the codified nature of research in those disciplines. Therefore, a little difference would be expected between study abroad and domestic graduates in their global engagements.

Standardization in the hard disciplines could be the reason for the significant differences in the soft disciplines and the lack of significant difference in the hard disciplines. Variation in disciplinary outcomes has become a common aspect of academic performance and therefore could have implications on global engagement in research. It is argued that the hard disciplines be standardised, and that publication is often in international journals and therefore suggesting that by design, they are global. It would, therefore, be more appropriate that comparisons between foreign and domestic graduates be sensitive to disciplinary variations.

Differentiation in productivity within academia extends to gender. Studies on academic productivity express perspectives pointing to low levels of productivity among females in comparison to their male colleagues (Rosterd & Arknes 2014, Rigg, McCarragher, & Krmeneč 2012). Again, the importance of marital status and marital relations in moderating research productivity among faculty was noted in the past (Lee & Bozeman 2005). The differences within gender categories were not examined, but the results of the current analysis found no significant differences between females with foreign doctorates and those with domestic doctorates. Differences were only found among the male categories. The finding poses strange implications that study abroad would make little difference in global engagement for females in the current family context. The result needs to be taken cautiously given the low numbers of females in the study and that the substantive difference between the two groups was large for the foreign doctorates. However, the outcome could be taken seriously within the context of further study of the

extent to which study abroad affects global engagement across gender, especially among females.

### **5.9. Conclusions**

On the research question seeking to determine the outcome of study abroad on global engagements in research, the results of the analysis suggested an affirmative response but with variations in outcomes. Education level, gender, academic discipline and academic rank provide additional information on the nature of the results. Following a postdoc experience differences between a foreign doctorate and domestic graduates disappear. Differences would also be found within the soft disciplines, among lecturers, and male faculty. The outcomes could have implications for study abroad policy and practice.

## **Chapter 6 : Study Abroad Outcomes Across forms of Research Engagement**

### **6.1. Introduction**

Using numerical data from the LCVA method, the chapter set out to answer the question: Do foreign doctorates become more globally engaged than domestic doctorates in specific research dimensions years after return? It follows from theoretical assumptions that foreign doctorates than domestic doctorates would be more globally engaged in research across all the forms of research engagement. Data extracted using the LCVA was analyzed using a generalized estimating equation (GEE) method as described in the next section. To further explore categories of outcomes, subsequent sections explore not the baseline model but also the three additional models. The follow-up models examine categories of study abroad outcomes conducted across education levels, academic discipline and academic rank and further illuminate study abroad outcomes in research. The beginning section for the baseline analysis starts with descriptive statistics and a description of the GEE procedure before presenting the results.

### **6.2. Descriptive Statistics**

The sample was grouped into foreign and domestic graduates to assess the mean outcomes and standard deviation on each dimension (Table 6.1). The dispersion of data as indicated by their standard deviations were nearly the same for both groups and can, therefore, be assumed to be the same. The summary statistics suggest that on average, foreign doctorates compared to domestic graduates had



higher levels of global engagement across dimensions except in international projects. The overall total outcome, however, reveals that foreign doctorates performed better than domestic domestics across all the research dimensions. Outcomes, however, changed when other explanatory variables were introduced during the GEE analysis.

*Table 6.1* Descriptive statistics of engagement outcomes by doctoral award (N=795)

Variables	Foreign doctorate		Domestic doctorate		Total	
	Mean	SD	Mean	SD	Mean	SD
Affiliation	2.02	2.62	1.64	2.78	1.92	2.66
Collaborations	0.64	2.22	0.27	0.79	0.55	1.97
Funding	0.53	1.18	0.18	0.54	0.45	1.07
Projects	0.32	0.95	0.42	1.79	0.35	1.21
Publications	1.48	2.75	1.33	2.47	1.44	2.68
Conferences	0.81	2.07	0.65	1.69	0.77	1.99
Notes:	SD = standard deviation					

### 6.3. GEE Analysis procedure

A GEE method developed by Liang & Zeger (1986) was applied to examine the global engagements of foreign doctorates in research and comparing with a reference group comprised of domestic doctoral graduates. Demographic characteristics in the data and other outcome measures of research engagement were entered into the analysis as covariates so as to determine outcomes on a specific dimension of research. A quasi-likelihood under the independence model criterion (QIC) proposed by Pan in 2001 and available in STATA 14 was used to identify appropriate correlation structures (Cui 2007). The QIC was applied using the negative binomial family with a log link function for all the outcome variables.

The analysis revealed that the independent correlation structure was a more appropriate structure for all the outcome variables but the GEE is robust to misspecification of the correlation structure. In addition to identifying the correlation structure of the data, the QIC method was also used for the selection of a parsimonious model that best explains the outcome for each of the outcome variables. The QIC with independent correlation structure and robust standard errors were used to fit a negative binomial with a log link function for each of the outcome variables.

In the current analysis, the dependent variables included each of the six dimensions of global engagement; international publications, collaborations, funding, affiliations, projects and conferences. The covariate of interest is the award type (foreign/domestic). The control covariates involved; age, experience, gender, academic discipline, academic rank, and education level. In addition, during estimation for each outcome, the remaining dimensions were included as covariates for control.

Given international publications as one example of research specific forms of global engagement, the analysis takes the form of the GEE equation. The mean model for international publications for an individual faculty at a specific time period will depend on the following parameters; degree award type, age of faculty, experience, gender, and academic discipline. It will also depend on the number of international collaborations, funding, affiliations, projects and conferences. It will also take into account, the data correlation structure, the constant, the exposure

time and the error term. Taking the mean international publications to be equal to zero and controlling for the rest of the variables the mean of degree award type can be determined by following the GEE equation on chapter 4 of this thesis. The applied GEE equation is represented below:

$$\begin{aligned}
 g(\text{International publications}_{ij}) &= \beta_0 + \beta_1 \text{Award type}_{ij} + \beta_2 \text{Age}_{ij} + \beta_3 \text{experience}_{ij} + \beta_4 \text{Gender}_{ij} \\
 &+ \beta_5 \text{Academic discipline}_{ij} + \beta_6 \text{Academic rank}_{ij} \\
 &+ \beta_7 \text{Education level}_{ij} + \beta_8 \text{collaborations}_{ij} + \beta_9 \text{funding}_{ij} \\
 &+ \beta_{10} \text{Affiliations}_{ij} + \beta_{11} \text{Projects}_{ij} + \beta_{12} \text{Conferences}_{ij} + \text{Time} \\
 &+ \text{CORR} + \text{error}_{ij}
 \end{aligned}$$

#### 6.4. Results of GEE analysis across forms of engagement

The analysis aimed at assessing the influence of a foreign doctorate on the six forms of global engagement in research for six years. GEE coefficients were converted into incident rate ratios. Therefore rates of global engagement are interpreted to mean engagement rates per year.

The results indicate that foreign doctorates were only associated with international funding. Results revealed that foreign trained doctorates were 3.82 times per year more likely to access international funding than the domestic-trained doctorates (Table 6.2). The implication being that they contribute more to direct financial inflows to the country. The increments for most dimensions, though substantively large had no statistical significance except for funding. For instance, access to

international collaborations, international affiliations and international conferences each had increased engagement rates for foreign doctorates compared to domestic doctorates. On the other hand, foreign doctorates compared to domestic doctorates had less international publications and international projects. Although the results were largely positive for foreign graduates of four dimensions, the differences were not significantly different except for international funding dimension. The analysis of specific dimensions of global engagement reflects a significant influence by individual characteristics and the increased association with other dimensions of research engagement, among the control variables. Specific model outcomes are reported separately.

### ***International publications***

In publications dimension, the average engagement of foreign graduates had no significant differences with domestic graduates. The substantive outcome was in favour of domestic graduates. The results also showed that age among other characteristics was correlated with global engagement. Age significantly increased average rates of engagement in publications per year. However, a percentage increase in age (age\*age), suggests that as people get much older, age significantly reduces average rates of engagement in publications per year. Other demographics including; gender, experience and being a postdoc had no association with international publications. Academic rank among demographics appear to have a high influence on publications. For instance, Professors and Associate Professors were more globally engaged than the senior lecturers and

lecturers and the difference was statistically significant. The implication is that study abroad graduates either have less interest in international publications or could be more preoccupied in activities other related research dimensions.

On the other hand, results also suggest that faculty who had more international affiliations, accessed international funding, and had international research collaborators were more likely to have international publications. For instance, international affiliations, international collaborations, and international funding were each associated with an increase in rates for international publications. The result suggests that global engagement for publications might rise given positive changes in affiliations, collaboration and funding. It also suggests that other than studying abroad, contextual factors following return are also crucial in determining rates of global engagement. However, building on them during the study abroad experience might better prepare graduates for international publications.

### ***International collaborations***

Under the collaboration dimension, study abroad again had no significant impact. Although foreign graduates on average had more international collaborations compared to domestic graduates, the difference was not statistically significant. On the contrary, the control variables; age, projects, publications, and conferences were found to affect global collaborations. Age among demographic factors, negatively affected average collaboration rates. International collaboration reduced on account of age. Meanwhile, other demographics; gender, experience,

postdoc experience and academic rank had no association with collaboration and were dropped from the model selection process.

Control variables in the research dimensions revealed that faculty with international projects and attended international conferences had a corresponding increase in rates of collaboration. For example; international projects, conference participation, and international publication would correspond to an increase in for collaboration. International affiliation and funding rates did not have a relationship with collaboration during the analysis.

### ***International affiliations***

Affiliations had no association with a foreign doctorate. Faculty with a doctoral study abroad experience had an increase in rates, but the increase was not significant. The indication is that study abroad has no association with international affiliations. On the contrary, academic level and outcomes and the other five dimensions of global engagement; projects, publications, collaboration, conferences, and funding were more associated with affiliations. Academic rankings negatively affected rates of global affiliations for lecturers compared to the base category; the Associate Professors. Being a lecturer signifies low levels of international affiliations and the difference was statistically significant. Differences between the Professors and the base category, and Senior Lecturers and the base category were not significant. Other demographics; age, gender and academic level (Ph.D. or Postdoc) were also not significant and therefore suggest

no association with global outcomes in affiliation. As a result, they were excluded from the explanatory model. The implication being that it makes a difference for a lecturer in terms of international affiliations irrespective of age, gender, and Ph.D. or postdoc.

Changes in other dimensions were found to be linked to variations in international affiliation rates. An increase in other dimensions of global engagement would be associated with an increase in affiliation rates. The analysis revealed that faculty with more funding access, conference presentations, access to projects and publications would have a corresponding increase in affiliations. Surprisingly, however, collaborations were linked to a reduction in international affiliation rates. This decrease is unexplainable considering the rise in rates of global engagements on the other four covariates linked with outcomes. The increase in affiliation is, therefore, a result of performance within the field of higher education research rather than identified faculty characteristics.

### ***International funding***

International funding was significantly associated with study abroad. Foreign graduates compared to domestic graduates would correlate with a significant increase in international funding. For instance; compared to domestic graduates, foreign graduates had an increase by 3.82 higher for global funding. Control variables also had interesting outcomes. Demographic factors were associated with global funding. Age predicted a negative association with global funding. As

an academic grows older above average faculty age of 49 years, rates of access to global funding were expected to decline. Again, lecturers and even senior lecturers, compared to Associate Professor would be associated with a reduction in access to international funding. Meanwhile, the increase for a Professor would be significant. Under education level, a postdoc compared to non-postdoc Ph.D. would have increased rates of access to international funding. The differences suggest that Professors and Associate Professors have better access to international funds, particularly when they are still young (below the average age of 49). Access to global funding is one dimension that represents a clear association with study abroad.

It was also noted that changes in other dimensions of global engagement also affected average rates of access to international funding. Whereas collaboration was had no association with funding, other dimensions of research including; affiliations, projects, publications and conferences were correlated with increased average funding rates. For instance; increased participation in international projects, additional international projects, greater international affiliations, international publications and more presentations at international conferences would be associated with increased rates of access to international funding. However, gender and level of collaboration do not affect the rates of access to global funds. While a foreign doctorate appears to increase access to global funding, variations could be expected on account of demographics; age and



academic rank as well as corresponding performances of faculty in other dimensions of research engagement.

### ***International projects***

Results further suggest that having a foreign doctorate negatively affected participation in global projects other factors in the model being constant. Results indicated that compared to domestic graduates, foreign doctorates would have a reduction in international projects but the difference was however not statistically significant. Control variables especially demographics had significant outcomes. For instance; compared to being female, males would be associated with an increase in average participation in global projects other factors remaining constant and the result was significant. Age and a postdoc experience had no association with international projects. Even more, participation rates would drop as one slides down the academic ladder from Professor to Lecturer. Study abroad had no relationship with global engagement in projects and even the objective results were in favour of domestic doctorates.

The relationship with other dimensions of research was positive except for publications. Affiliations, collaborations and access to international funds were associated with enhanced global engagement in projects. For instance, affiliations were expected to be connected with an increase in participation rates for international projects. By the same token, international collaboration, and international funding would each correspond to significant increases in

participation rates for projects when other factors are held constant. Publications surprisingly had no association with projects and was excluded from the model. The implication is that male academics, with high rates of international affiliations, great number of collaborations and more access to funding would be associated with high access rates to international projects. This result further shows that study abroad per se might have less impact, but its outcomes could be improve given other factors.

### ***International conferences***

Conferences as the final dimension for assessment also had no correlation with a foreign doctorate. Results revealed that foreign doctorates appear to have higher rates than domestic graduates. Foreign doctorates compared to domestic doctorates had an increase in participation rates, but the difference was non-significant. Results for control variables, on the other hand, suggested that education level, faculty academic rank, and rates of international affiliation, collaboration rates and access to international funding were associated with participation in international conferences. Among demographic factors, academics other than Associate Professors were likely to have low outcome rates in international conferences. Professors, for example, had a reduction in average rates for conferences, and the outcome was significant. There were no significant differences between the associate professors and the lower academic ranks. According to the result, professors participate less in international conferences compared to the other ranks. Also, age was linked to a reduction in presentations

at international conferences but no changes by gender. Age, therefore, might explain the high performance of lower ranks compared to the top rank faculty.

Changes in international participation in conferences was further found to be associated with international affiliations, international collaborations, international funding, and international projects. Each of these variables would correspond with an average increase in conference presentations. For instance; international affiliation, international collaborations, international funding, and international publication increments would each correspond to significant increases in international presentations at conferences when other factors were held constant. In short, results suggest that better outcomes in international conference presentations would increase given a postdoc experience for faculty, active faculty in international publications, collaborations, affiliations, projects and access international funding. High levels of engagement would be possible when faculty are still young irrespective of gender.

### ***Conclusions***

In conclusion, GEE was applied in comparing the average level of global engagement for foreign and domestic doctoral graduates, and results had mixed outcomes for a foreign doctorate. Study abroad had a significant outcome only in international funding. It also emerged that demographics play a major role in determining outcomes. More especially, being an associate professor or professor increases rates of global engagement in most of the outcome variables. Age also

affected outcomes while gender had little influence on the results except in international projects. Similarly, faculty who were involved in most or all of the global engagement dimensions were more likely to increase their overall rates of global engagement in all dimensions. Meanwhile postdoc experience sometimes improved global engagement rates. The improvement is interesting because the study focused on doctoral graduates with no regard to additional study abroad experience. Aware that significant differences occurred between postdoc experience and a Ph.D., additional analysis is needed to take into account differences due to a postdoc experience. The comparison would provide a better picture how each group; foreign and domestic doctorates would perform given a postdoc experience when covariates are controlled.

Table 6.2: GEE table for global engagement across research dimensions (N=795)

Notes	Variables	Publications	Collaborations	Affiliations	Funding	Projects	Conferences	
<p>Exponentiated coefficients. Standard errors in parentheses. Starred = * p&lt;0.05; ** p&lt;0.01; *** p&lt;0.001.</p> <p>a = Category for a dummy variable award with domestic as the reference category.</p> <p>b = Category for a dummy variable gender with female as the reference category.</p> <p>c = Category for a dummy variable education with Ph.D. as the reference category.</p> <p>d = Category for a dummy variable Academic rank with lecturer as the reference category.</p> <p>e = Category for a dummy variable discipline with hard discipline as the reference category.</p>	Foreign <sup>a</sup>	0.977 (0.219)	1.564 (0.560)	1.497 (0.382)	3.816** (1.646)	0.522 (0.390)	1.176 (0.301)	
	Age	1.485*** (0.160)	0.963* (0.018)		0.949** (0.018)		0.996 (0.013)	
	Age*Age <sup>b</sup>	0.996*** (0.0011)						
	Gender (male) <sup>c</sup>					2.987* (1.423)		
	Postdoc <sup>d</sup>				2.257** (0.713)		1.931** (0.475)	
	Professor <sup>d</sup>	1.178 (0.267)			1.078 (0.317)	0.498 (0.262)	0.278** (0.423)	
	Lecturer	0.415*** (0.105)			0.387** (0.123)	0.427* (0.161)	0.633 (0.193)	
	Senior Lecturer	0.585* (0.136)			0.677 (0.191)	0.309** (0.138)	0.737 (0.227)	
	Level <sup>e</sup>					0.839 (0.107)		
	Affiliations	1.065* (0.029)				1.084 (0.052)	1.167** (0.065)	1.158*** (0.037)
	Collaborations	1.266*** (0.034)			0.924* (0.029)		1.168** (0.062)	1.122** (0.040)
	Funding	1.105 (0.084)			1.128* (0.0662)		1.491*** (0.144)	1.196** (0.078)
	Projects			1.208*** (0.068)	1.083* (0.0410)	1.202* (0.097)		1.193** (0.074)
	Publications			1.376*** (0.034)	1.080** (0.028)	1.059 (0.040)		1.067 (0.036)
	Conferences			1.117** (0.038)	1.126*** (0.033)	1.069* (0.031)		
_cons	-8.247** (2.854)	-0.959 (0.855)	-0.959 (0.855)	-0.0516 (0.555)	-0.841 (1.653)	-2.426 (1.285)	-1.621 (0.929)	

### **6.5. Examining global engagement across education levels**

The analysis was done to determine whether there is a difference in outcomes for those with a postdoc experience compared to those without a postdoc. Data was split so that Ph.D. and Postdocs were separated. Each group had its domestic counterparts as a reference category. Summary statistics of means and GEE analysis were conducted, and outputs examined across the two education levels (Table 6.3).

### **6.6. Descriptive Statistics**

Table 6.2 below represents descriptive statistics for the outcomes of study abroad on the various dimensions of research engagement. The results indicate that among the Ph.D. category, the foreign doctorate had higher average engagements in all dimensions except in the project dimension and with little dispersion in all categories. Among the postdoc, foreign doctorates again had a lead in engagements except in projects and conference dimensions. Again the dispersion was less than three standard deviations and could be considered to be small. Overall, therefore, the foreign doctorates appear to be performing better than the domestic doctorates in each category.

Table 6.3: Descriptive table for engagements across education by award (N=795)

Variable	Category Award	Education levels			
		PhD		Postdoc	
		Mean	SD	Mean	SD
Affiliation	Domestic	1.63	2.88	1.68	2.02
	Foreign	1.91	2.60	2.87	2.59
	Total	1.84	2.68	2.55	2.50
Collaboration	Domestic	0.27	0.81	0.28	0.61
	Foreign	0.65	2.32	0.57	1.25
	Total	0.56	2.06	0.50	1.12
Funding	Domestic	0.13	0.45	0.56	0.87
	Foreign	0.49	1.11	0.90	1.56
	Total	0.40	1.00	0.81	1.41
Projects	Domestic	0.40	1.85	0.56	1.36
	Foreign	0.33	0.98	0.29	0.65
	Total	0.35	1.25	0.37	0.89
Publications	Domestic	1.36	2.60	1.12	1.30
	Foreign	1.49	2.82	1.43	2.09
	Total	1.46	2.77	1.34	1.91
Conferences	Domestic	0.53	1.55	1.44	2.33
	Foreign	0.75	2.02	1.29	2.41
	Total	0.70	1.92	1.33	2.38
Notes:	SD = Standard deviation				

### 6.7. Results of the GEE analysis across education levels

The results of the GEE analysis showed more positive outcomes for foreign graduates in international funding. The Ph.D. holders sourced 2.42 times international funding per year than their domestic counterparts in the respective category (Table 6.4). The indication is that foreign trained faculty on average accessed more consultancy and grants compared to domestic faculty. A foreign doctorate however appeared to have a drawback in access to international projects and international conferences among the postdoc category. No significant differences were observed between foreign and domestic graduates in their global

publications, collaborations, and affiliations. Overall, the analysis reveals that postdoc graduates with foreign PhDs were more globally engaged compared to postdocs with domestic PhDs especially in the international publishing and affiliation to international bodies. Results of covariates for each outcome variable were however fairly consistent with the baseline analysis.

### ***International publications***

Results in the postdoc category support the assumption that study abroad graduates would have higher rates of international publications than domestic graduates. In both postdocs and the PhD category, foreign doctorates had no significant differences in international publications. Covariates including age and age<sup>2</sup> were significantly associated with publications. For postdoc category, age was associated with an increase in international publications but declined with a percentage increase in age. Academic discipline and rank correlated with international publications. On the other hand, collaboration and conferences were related to increased international publications. Gender, academic discipline, international projects and funding had no significant correlation with international publications.

Similarly, foreign Ph.D. had no difference in international publications with their domestic colleagues having the same qualification. Even the substantive results suggest lower average publications for the foreign doctorate and therefore consistent with outcomes of the main analysis. Control variables, including age,



academic discipline, academic rank, and a postdoc qualification were associated with the level of global engagement in publications. In addition, international collaboration, and affiliation were associated with increased rates of international publications. No significant correlation was found with other control variables including; gender, international projects, funding and conferences. The outcomes suggest study abroad offers little in international publication rates among both PhD and postdoc.

### ***International collaborations***

In collaboration outcomes, neither a foreign Ph.D. nor postdoc had a significant difference with their domestic colleagues and suggesting no significant relationship between a doctorate abroad and international collaborations. However, there was a substantive average increase for the Ph.D. category. Most control variables, on the other hand, were associated with international collaboration outcomes. For instance, faculty in the soft disciplines would have a reduction in international collaboration compared to faculty in the hard disciplines. Other dimensions of research including; international conferences, projects and publications were equally associated increased collaboration for faculty with a Ph.D. Age, gender, academic rank, international funding and affiliations had no significant association with collaboration rates for the Ph.D. category.

Like Ph.D. faculty, foreign doctorates among postdoc faculty had no significant differences with domestic faculty. While foreign doctorates were expected to

perform better than the domestic doctorates, even the substantive outcomes showed that foreign doctorates lower international collaborations compared to the domestic doctorates. In the control variables, affiliation, funding and publications were associated with increased rates of international collaborations. However, being a professor compared to being a lecturer in the postdoc category would correlate with lower international collaborations. For both postdocs and non-postdocs therefore, collaboration rates could be better explained by age, projects, and publications than a foreign doctorate. Conferences would only be associated with collaboration for postdocs. Age, gender, projects and conference rates had no significant association international collaboration rates. International collaboration is, therefore, less a function of study abroad among both PhD and postdoc faculty.

### ***International funding***

Consistent with the research hypothesis, international funding rates increased significantly more for the foreign Ph.D. compared to the domestic Ph.D. within the Ph.D. category. Age significantly contributed to an increase in funding rates, but a percentage increase in age was linked to a decline in funding rates. Also, a professor than a lecturer would have a significant increase in access to international funding. International conference presentations would also be associated with a significant increase in international funding. However, gender and academic discipline had no significant association with funding among the Ph.D. category. furthermore; international publications, international projects, and

international collaboration had no significant associations with funding, but there were substantive increments in all the three variables.

Results for the postdoc category were not significant although there was a substantive increase in favour of the foreign doctorates. The assumption that foreign doctorates would have greater access to international funding was not supported within among the postdoc faculty. Age, gender, academic discipline, rank and international projects had no significant correlation with international funding. In the same way, affiliations to international professional bodies, international collaborations, international conference presentations and international publications levels had no significant association with access to international funding for postdoc group. The outcome by education level had few correlations with covariates in contrast to the main analysis where most of the covariates had a significant outcomes with international funding rates.

### ***International affiliations***

In this grouped analysis for affiliation, the foreign doctorates were expected to have higher rates of international affiliations within Ph.D. and postdoc categories. It emerged that foreign graduates with a postdoc were 3.18 times more engaged in international bodies per year compared to fellow postdocs. The result is non-significant and does not support to the research hypothesis. In the control variables, being a professor in the postdoc group was linked to increased affiliation rates. Similarly, participation in international projects and presenting at

international conferences was associated with an increase in affiliations. However, international publications, international funding, and international collaboration had no significant link with affiliation. Even age, gender, and academic discipline had no correlation with international affiliations for the postdoc category.

Like in the postdoc category, the assumption that foreign doctorates would perform better in affiliations was not supported even within the Ph.D. category. No differences were found between foreign and domestic doctorates in the Ph.D. category. For Ph.D. faculty, being a professor, presenting at international conferences and additional international publications were associated with an increase in international affiliations. In a surprise, international collaborations would be linked to a significant decline in international affiliation. Meanwhile, male faculty compared to females would have less international affiliations compared to female faculty within the same Ph.D. category. Age, academic discipline, funding and projects had no significant association with international affiliations. Therefore, in as far as international affiliation dimension is concerned, the results suggest the importance of a postdoc experience especially for faculty with a foreign doctorate.

### ***International projects***

Results among postdocs ran counter to the research assumptions. Contrary to the hypothesis that foreign doctorates would have higher rates of access to international projects, the results revealed a lower rate of international projects for the foreign doctorates within the category of postdocs. The significantly lower rate

for foreign doctorates indicates that the assumption is not supported at least within the postdoc category. Among control variables, age, academic rank and affiliation were significant covariates. A percentage increase in age would have a corresponding increase in international projects but the annual rise in age would have a corresponding decline in international projects. Professors compared to lecturers would have significantly lower rates of international projects, but international affiliations would correspond significantly with an increase in international projects. Gender, academic discipline, international collaborations, funding, conferences, and publications did not have a significant correlation with international projects.

Even in the Ph.D. category, the results did not support the assumption of increase outcomes for the foreign doctorate. Even the objective result suggest lower average rates in projects for the foreign doctorates in the Ph.D. category. Academic rank correlated with international projects. In addition, professors than lecturers had significantly higher access to international projects. Furthermore, international funding, and international conferences, were positively associated with international projects rates. On the contrary, age, academic discipline and gender were no longer correlated with outcomes. Also, international collaboration, affiliations, funding, and publications had no significant association with international projects among Ph.D. faculty. Therefore, in comparing foreign doctorates and domestic doctorates, foreign doctorates with postdocs had lower rates compared to domestic doctorates. A postdoc experience might therefore

could either have negative consequences for foreign doctorates or positive outcomes for domestic doctorates.

### ***International conferences***

In the postdoc category, a significant difference was found between foreign and domestic graduates in conference presentations. Compared to domestic doctorates, foreign doctorates had a significantly low average rate international conferences. The assumption that foreign doctorates would have higher rates of presentations at international conferences was rejected. Among covariates, affiliations were highly correlated with international conferences. Meanwhile, professors within the postdoc category had lower participation in conferences compared to lecturers. All the remaining covariates in the model had no significant correlation with international conference presentation rates.

In the Ph.D. category, the foreign doctorates had an average in rates for conferences, but the difference with domestic doctorates was not significant. The high expectations in international engagement were not supported within the Ph.D. group in the current analysis. International affiliation, collaboration, funding, and projects were all positively correlated with international conferences. Covariates, including; age, age\*age, gender, academic rank, discipline and international publication had no significant association with international conferences for the Ph.D. group.

### ***Conclusions***

In summary, a postdoc is an outstanding experience for faculty with a foreign doctorate. A postdoc has a corresponding increase in global engagement rates for international affiliations. However, foreign doctorates with a postdoc experience performed poorly in international projects and conferences compared to domestic doctorates with a postdoc experience. Overall, increased engagement in other dimensions of research suggests a stronger mechanism of improving overall global engagement in research.

Table 6.4 GEE table for outcomes across education levels (N=795)

Variables	Publications		collaborations		Funding		Affiliation		Projects		Conferences	
	PhD	Postdoc	PhD	Postdoc	PhD	Postdoc	PhD	Postdoc	PhD	Postdoc	PhD	Postdoc
Foreign <sup>a</sup>	0.999 (0.268)	1.428 (0.330)	1.197 (0.476)	0.566 (0.470)	4.355** (2.420)	1.322 (1.116)	1.435 (0.409)	3.178 (2.023)	0.735 (0.579)	0.0283** (0.0329)	1.264 (0.413)	0.243* (0.170)
Age	1.548*** (0.197)	1.474** (0.220)	0.908 (0.156)	1.145 (0.267)	1.495 (0.347)	1.042 (0.334)	0.834 (0.124)	1.204 (0.237)	1.329 (0.520)	0.286** (0.135)	1.256 (0.178)	1.239 (0.419)
Age*Age	0.995*** (0.001)	0.996** (0.002)	1.001 (0.002)	0.998 (0.002)	0.995* (0.002)	0.999 (0.003)	1.001 (0.002)	0.998 (0.002)	0.996 (0.004)	1.013** (0.005)	0.998 (0.001)	0.997 (0.003)
Male <sup>b</sup>	0.872 (0.186)	0.845 (0.301)	0.941 (0.309)	1.228 (0.532)	0.819 (0.396)	1.188 (0.858)	0.650 (0.186)	2.047 (1.239)	1.842 (0.987)	0.976 (1.356)	0.790 (0.229)	1.212 (1.055)
Soft <sup>c</sup>	1.422 (0.312)	0.490* (0.143)	0.399** (0.120)	1.004 (0.747)	0.675 (0.233)	0.916 (0.449)	0.915 (0.242)	0.640 (0.324)	0.333 (0.214)	0.643 (0.719)	1.596 (0.431)	1.314 (0.692)
Professor <sup>d</sup>	1.785* (0.454)	4.923*** (1.697)	1.165 (0.364)	0.159* (0.131)	2.953** (1.146)	0.772 (0.575)	3.260*** (0.968)	2.826* (1.458)	5.077** (2.898)	0.0373* (0.054)	1.323 (0.433)	0.138* (0.122)
Affiliation	1.068* (0.031)	0.974 (0.052)	0.955 (0.061)	1.424*** (0.120)	1.059 (0.065)	1.111 (0.168)			1.105 (0.071)	1.886*** (0.262)	1.137*** (0.040)	1.770*** (0.254)
Collaboration	1.301*** (0.048)	1.578*** (0.211)			1.013 (0.057)	1.197 (0.219)	0.941 (0.036)	1.025 (0.090)	1.118 (0.089)	0.937 (0.133)	1.183*** (0.056)	0.773 (0.165)
Funding	1.108 (0.070)	0.881 (0.076)	1.155 (0.090)	1.314* (0.175)			1.079 (0.094)	0.961 (0.094)	1.300 (0.186)	1.161 (0.206)	1.241** (0.092)	1.087 (0.098)
Projects	1.048 (0.036)	1.091 (0.125)	1.134* (0.073)	1.242 (0.229)	1.071 (0.093)	1.267 (0.170)	1.054 (0.047)	1.385* (0.194)			1.154* (0.082)	0.952 (0.131)
Conferences	1.026 (0.031)	1.140* (0.070)	1.105** (0.041)	0.888 (0.081)	1.115*** (0.034)	1.086 (0.067)	1.115** (0.038)	1.142** (0.052)	1.130** (0.053)	0.861 (0.115)		
Publications			1.362*** (0.033)	1.432*** (0.147)	1.066 (0.051)	0.968 (0.089)	1.084** (0.027)	0.954 (0.060)	1.001 (0.069)	1.128 (0.157)	1.023 (0.045)	1.201 (0.152)
Observations	705	93	705	93	705	93	705	93	705	93	705	93

Notes: Exponentiated coefficients; Standard errors in parentheses; Starred = \* p<0.05; \*\* p<0.01; \*\*\* p<0.001  
Education: Grouping variable composed of Ph.D. and Postdoc categories.  
a = Category for a dummy variable award with domestic as the reference category.  
b = Category for a dummy variable gender with female as the reference category.  
c = . Category for a dummy variable discipline with hard discipline as the reference category.  
d = Category for a dummy variable Academic rank with lecturer as the reference category.



## **6.8. Examining global engagement across academic disciplines**

To further examine outcomes of a foreign doctorate on global engagement rates in research, an additional secondary analysis across disciplines was done. For want of an adequate sample, disciplines were merged. Two general disciplinary categories were created; hard and soft disciplines as done by Shin & Jung (2014). The assumption was that there would foreign doctorates would become more globally engaged compared to domestic doctorates across the disciplinary categories; soft and hard. The GEE method was applied and results presented after the descriptive statistics.

## **6.9. Descriptive statistics**

Table 6.5 is the descriptive analysis of study abroad outcomes across disciplines for the various dimensions of global engagement. The results suggest an average increase in results for the foreign doctorate in affiliations, collaborations, funding, publications, and conferences compared to the domestic doctorates in the hard disciplines. Domestic doctorates took a lead in access to international funding and projects dimensions within the hard disciplines. Within the soft disciplines, the foreign doctorates compared to domestic doctorates had lower engagements in all dimensions except in publications. The descriptive statistics suggest that, when faculty is grouped in terms of disciplines, foreign doctorates are less competitive globally than domestic doctorates in the soft disciplines and more competitive in the hard disciplines.

Table 6.5: Descriptive statistics for outcomes across academic disciplines (N=795).

Variable	Award	Academic Disciplines			
		Hard		Soft	
		Mean	SD	Mean	SD
Affiliation	Domestic	1.30	1.62	1.81	3.22
	Foreign	2.31	2.56	1.75	2.65
	Total	2.12	2.44	1.77	2.82
Collaboration	Domestic	0.42	0.96	0.20	0.67
	Foreign	1.15	3.07	0.18	0.66
	Total	1.01	2.81	0.19	0.67
Funding	Domestic	0.22	0.57	0.16	0.52
	Foreign	0.74	1.35	0.34	0.95
	Total	0.65	1.25	0.29	0.85
Projects	Domestic	1.06	2.95	0.09	0.36
	Foreign	0.51	1.24	0.15	0.53
	Total	0.62	1.71	0.14	0.49
Publications	Domestic	1.25	2.22	1.37	2.60
	Foreign	1.81	3.22	1.18	2.20
	Total	1.71	3.06	1.24	2.33
Conferences	Domestic	0.58	1.32	0.68	1.85
	Foreign	0.99	2.51	0.66	1.58
	Total	0.91	2.33	0.66	1.66
Notes:	SD = Standard deviation				

### 6.10. Results of GEE analysis across disciplines

GEE analysis for each of the outcome dimensions of global engagement in research and across the hard and soft disciplines. Results of the analysis across the disciplinary categories revealed foreign doctorates on average had no significant differences with domestic doctorates for most of the dimensions of global engagement except in access to international funding within the soft disciplines (Table 6.6). Foreign doctorates had an advantage in the soft disciplines for international affiliations than a domestic doctorate. A foreign doctorate in the soft disciplines had 2.92 times more access to international funding than the

domestic graduate. It implies that foreign doctorates had a greater share of access to consultancy and grants. In addition, foreign doctorates also had 1.96 times more international affiliations than domestic doctorates in the hard disciplines. However, foreign doctorates had no significant differences with domestic doctorates in international collaborations, publications, projects and conferences within both the hard and soft disciplines. In addition, no significant differences were found between foreign and domestic doctorates within the hard disciplines in international funding and soft disciplines in international affiliations. .

### ***International publications***

The assumption that foreign doctorates would have more in international publications than the domestic doctorates guided the analysis. The publication dimension suggests a poor correlation between study abroad and global engagement. The results reveal doctoral study abroad did not have a significant difference in international publications compared to domestic doctorates. Particularly in the hard disciplines, foreign doctorates had a reduction in objective outcomes on international publications compared to domestic doctorates. On the contrary, covariates were more associated with outcomes. For instance; age would be linked to an increase in outcomes, though a percentage increase in age would correspond to a decline. Postdoc compared to Ph.D. would have increased rates in international publications. Furthermore, international collaborations, and funding had corresponding increases in publications. Academic rank, international

projects, affiliations and conferences had non-significant association with international publications for the hard disciplines.

Within the soft disciplines, the rates for international publications for foreign doctorates increased in the soft disciplines, but the difference was not statistically significant. The outcome, therefore, did not support the assumption about increase rates for foreign doctorates despite the substantive differences in favour of the foreign doctorate. Many control variables were significant. Like in the hard disciplines, age would be associated with an increase in outcomes, but a percent increase in age would correspond to a decline in international publications. Professors in the soft disciplines would also have increased publications compared to a lecturer. International affiliations, and collaborations within the soft disciplines had a corresponding increase in international publications. However, education level and international conferences had no significant correlation with international publications within the soft disciplines. International publications is one dimension where outcomes of study abroad are negligible.

### ***International collaborations***

Foreign doctorates were assumed to have on average, higher rates of international collaborations in research than domestic doctorates. The objective outcomes revealed a higher average for foreign doctorates, but the outcome was not significant and therefore no difference between the two groups. In the hard disciplines still, international funding, conferences, and publications were associated with significant increments in international collaboration rates.

Moreover, males had increased chances of international collaboration than female faculty. Age, age\*age, academic discipline, and even education (postdoc experience) had no significant association with international collaboration. Similarly, affiliation, funding, projects, and conferences had no significant association with international collaboration within the hard disciplines. Increased international collaboration is, therefore, more associated with funding, conferences, publications and being male than female.

Within the soft disciplines, foreign doctorates had lower average collaboration rates. The result was not significant. The assumptions of increased rates of international collaborations were therefore not supported within the hard and soft disciplines. While all the covariates in the model turned out to be non-significant, the correlation between publications and international collaboration turns out to be highly significant. Like in the hard disciplines and even in the main analysis, it turns out that even in the soft disciplines, faculty who had more international publications were also more likely to have international collaborations. Characteristics including; age, academic discipline, academic rank, education level (postdoc), and gender had no significance in the outcomes. Other dimensions of research; affiliation, funding, projects and conferences did not also have a significant correlation with international collaboration. In addition to international publications, international collaborations represent an additional dimension where study abroad outcomes are insignificant.

### ***International funding***

In the funding dimension, the expectations of an increase in access to international funding for foreign doctorates was not supported by the outcomes. Within the hard disciplines, there was no significant difference between foreign and domestic doctorates. Other control variables especially; international affiliations and conferences would correspond to increased access to international funding rates. A percentage increase in age, academic rank, gender, and education level had no significant association with international funding. Similarly, international collaborations and publications had no significant relationship with international funding within the hard disciplines.

The analysis within the soft disciplines also had positive results for the foreign doctorates. The average rates in international funding for the foreign doctorates in the hard disciplines were significantly higher compared to a domestic doctorate. It supports the assumption that foreign doctorates would have greater access to international funding compared to domestic doctorates. In the soft disciplines, control variables; a postdoc experience and access to international projects were associated with an increase in international funding rates. Age, academic rank, and gender had no significant correlation with international funding. Similarly, international affiliations, collaborations, conferences and publications had no significant relationship with access to international funding within the soft disciplines.

### ***International affiliations***

The outcomes on international affiliation dimension provide evidence that a foreign doctorate would correspond to increase in global engagements. Within the hard disciplines, a foreign doctorate compared to a domestic doctorate was associated with greater international affiliations. In the hard disciplines, international funding, international projects, and international conferences would significantly correspond to an average increase in rates for affiliations. Furthermore, increased affiliation rates were also more significantly correlated with a postdoc experience. However, gender, age, academic rank, international collaboration and publication had no significant correlation with international affiliation.

Contrary to results in the hard disciplines, foreign doctorates in the soft disciplines had no significant increase in international affiliations compared to domestic doctorates. The assumption that foreign doctorates would have the edge over domestic doctorates in international affiliation had no supporting evidence in the outcome. For the control variables, international publications and international conferences would significantly correspond to increased rates of international affiliation rates in the soft disciplines. Likewise, professors compared to lecturers had significant and higher rates of affiliation to international professional bodies in the soft disciplines. Collaboration, funding and projects had no association with international affiliations. Furthermore, age, gender and academic rank had no differences in affiliation rates. The result suggests the importance of a foreign doctorate for access to international affiliations within the hard disciplines.

### ***International projects***

Analysis of engagement across disciplines also found no relationship between a foreign doctorate and international projects. Within each disciplinary area, there was no significant difference between foreign and domestic doctorates in rates of participation in international projects. In the hard disciplines for instance; substantive differences between foreign and domestic doctorates showed lower average rates for the foreign doctorates. On the side of the covariates, a stronger correlation was found between international affiliation and international projects. On the other hand, age, gender, academic rank and education level had no significant association with the outcome. Correspondingly, international collaboration, projects, conferences and publications within the hard disciplines had no significant association with access to international projects.

Even in the soft disciplines, foreign doctorates had no significant difference with domestic doctorates despite the substantive difference in favour of foreign doctorates. International funding was one covariate correlating with increased access to international projects in the soft disciplines. On the other hand, age and even a percentage increase in age would have no significant correspondence with outcomes international projects in the soft disciplines. Furthermore, academic rank, education level, and gender had no significant association with international funding. Collaborations, conferences, affiliations and publications also had no association with rates of access to international projects within the soft disciplines. International projects is another dimension where study abroad shows little correlation with global engagements in research.



### ***International conferences***

In the conference dimension, the assumptions of the study were not supported. Results showed no significant difference between foreign and domestic doctorates on international conference presentation rates across the disciplines. Instead, other research dimensions especially affiliation were correlated with conference presentations for both the hard and soft disciplines. In the hard disciplines for example; having a postdoc experience, international affiliations, collaborations and funding were linked to an increase in rates of international conference presentations. Most of the background characteristics such as age, gender, and academic rank did not have a significant correlation with international conferences. Even other control variables including access to international projects and international publications were not significantly correlated with international conferences in the hard disciplines.

In the soft disciplines, the other research dimensions were more associated with international conferences than having a foreign doctorate. For instance, international affiliations, projects, and publications would also correspond with an increase in international conferences. Demographic factors such as age, academic rank, and gender had no significant correlation with international conferences within the soft disciplines. Additionally, international collaborations and funding equally had no significant relationship with international conferences. Therefore, results in the international conference dimension further indicate that

study abroad hardly correlates with global engagement in some of the research dimensions.

### ***Conclusion***

In summary, when all the covariates in the models were controlled, a foreign doctorate compared to a domestic doctorate makes a difference with respect to international funding in the soft disciplines and international affiliations for hard disciplines. It would be of interest to probe further to identify categories of foreign doctorates within the soft disciplines with greater access to international funds. Furthermore, the analysis could examine variations within faculty ranks. In the meantime, many covariates were associated with outcomes. For international publications across disciplines, therefore, it might be argued that age, rank, and collaboration are key predictors of international publications. Affiliation to international organizations matters for soft disciplines as affiliations is to the hard disciplines. Conferences and publications might be useful covariates to explain collaboration but age, and international projects were discipline specific predictors. Academic rank, projects, publications, and conferences were helpful in understanding affiliation rates across disciplines. Conversely, affiliation in hard disciplines and funding in the soft disciplines might be more viable ways of assessing projects rates across disciplines. Academic rank, projects, and publications were associated with conferences rates, but there was no significant difference in international conference participations between foreign and domestic Ph.D. in both the hard or soft disciplines.

Table 6.6: GEE table for outcomes across disciplines (N=795).

Variables	Publications		Collaborations		Funding		Affiliations		Projects		Conferences	
Discipline	Hard	soft	hard	soft	hard	soft	hard	soft	Hard	Soft	hard	soft
Foreign <sup>a</sup>	0.832 (0.257)	1.297 (0.342)	1.421 (0.549)	0.764 (0.451)	2.859 (2.159)	2.916* (1.475)	1.959* (0.659)	1.774 (0.636)	0.312 (0.255)	1.467 (0.725)	0.937 (0.359)	1.187 (0.400)
Age	1.691*** (0.212)	1.432* (0.218)	0.929 (0.110)	1.125 (0.212)	1.481 (0.422)	1.063 (0.286)	1.248 (0.203)	0.780 (0.128)	0.871 (0.375)	1.648 (0.478)	1.169 (0.216)	1.396 (0.258)
Age*Age <sup>b</sup>	0.994*** (0.001)	0.996** (0.002)	1.000 (0.001)	0.999 (0.002)	0.996 (0.003)	0.998 (0.003)	0.998 (0.002)	1.002 (0.002)	1.000 (0.004)	0.995 (0.003)	0.998 (0.002)	0.997 (0.002)
Professor <sup>c</sup>	1.822 (0.620)	2.061* (0.599)	1.076 (0.349)	0.613 (0.376)	2.097 (1.150)	1.844 (1.115)	1.444 (0.428)	5.477*** (1.985)	4.386 (4.387)	2.679 (1.880)	0.817 (0.343)	1.639 (0.567)
Male <sup>d</sup>	0.775 (0.241)	0.896 (0.222)	1.915* (0.608)	0.534 (0.268)	1.794 (1.062)	0.507 (0.240)	0.517 (0.205)	0.974 (0.313)	3.094 (2.935)	1.836 (0.859)	0.845 (0.355)	0.850 (0.312)
Postdoc <sup>e</sup>	1.938** (0.433)	0.618 (0.191)	0.883 (0.230)	0.769 (0.651)	1.710 (0.738)	2.955* (1.631)	1.731* (0.478)	1.197 (0.733)	1.099 (0.740)	2.032 (1.078)	2.226* (0.701)	1.954 (1.054)
Affiliations	0.981 (0.043)	1.096* (0.040)	0.962 (0.076)	1.066 (0.112)	1.158* (0.073)	1.051 (0.091)			1.386*** (0.121)	0.953 (0.068)	1.157* (0.068)	1.124** (0.046)
Collaborations	1.317*** (0.044)	1.571*** (0.167)			1.004 (0.077)	1.183 (0.211)	1.022 (0.051)	1.066 (0.133)	1.138 (0.127)	1.254 (0.282)	1.223** (0.083)	1.162 (0.147)
Funding	1.138* (0.064)	1.061 (0.150)	1.139* (0.063)	1.301 (0.303)			1.140* (0.072)	0.986 (0.120)	1.206 (0.179)	1.716*** (0.155)	1.246** (0.102)	1.149 (0.125)
Projects	1.057 (0.037)	1.054 (0.241)	1.119 (0.075)	1.378 (0.614)	1.032 (0.102)	2.084*** (0.321)	1.147*** (0.046)	0.866 (0.168)			1.078 (0.074)	1.775*** (0.211)
Conferences	0.985 (0.031)	1.091 (0.057)	1.100* (0.042)	1.128 (0.097)	1.113** (0.043)	1.015 (0.036)	1.079* (0.033)	1.134*** (0.039)	0.972 (0.058)	1.231*** (0.074)		
Publications			1.369*** (0.044)	1.377*** (0.050)	1.022 (0.047)	1.002 (0.056)	0.993 (0.038)	1.082** (0.027)	0.969 (0.095)	0.976 (0.078)	0.967 (0.067)	1.087* (0.043)
Observations	352	446	352	446	352	446	352	446	352	446	352	446

Notes: Exponentiated coefficients; Standard errors in parentheses; Starred = \* p<0.05; \*\* p<0.01; \*\*\* p<0.001  
Discipline: Grouping variable for academic disciplines and is composed of hard and soft disciplines.  
a = Category for a binary variable award with domestic as the reference category.  
b = quadratic for age representing age squared.  
c = Category for a binary variable academic rank with lecturer as the reference category.  
d = .Category for a binary variable gender with female as reference category  
e = category for a binary variable with female as the reference

### **6.11. Examining global engagement across academic ranks**

Although academic ranks are associated with variation in global engagement outcomes in the prior analysis, the influence of foreign doctorates needs to be examined. The analysis was conducted to explore further whether a foreign doctorate affects rates of global engagement across categories of academic ranks; lecturers and professors. The assumption was that foreign doctorates compared to domestic doctorates would have increased outcomes across lecturer and professor categories. Aware of sample size limitations and the need to maintain statistical power in the analysis, academic ranks were merged into two categories. Professors and Associate Professors were combined into professor category. Senior lecturer and lecturer were also merged into lecturer category. Both analysis results were produced and presented subsequent sections by the dimension of research engagement.

### **6.12. Descriptive statistics**

In Table 6.7, results of the descriptive statistics for study abroad outcomes suggest that foreign doctorates at the level of lecturer were on average more globally engaged on the global scale and in all dimensions than domestic doctorates of the same category. On the other hand, professors who had foreign doctorates were on average less globally engaged than domestic doctorates across dimensions except in the project dimension. However, the differences were quite small and the difference might only be a result of the large dispersion of three and above

standard deviations as seen across most of the dimensions of research engagement for the professors.

Table 6.7: Descriptive results of outcomes across academic ranks by award (N=795)

Variables	Award	Academic rank			
		Lecturers		Professors	
		Mean	SD	Mean	SD
Affiliation	Domestic	0.54	0.96	3.09	3.63
	Foreign	1.53	2.19	2.89	3.07
	Total	1.31	2.02	2.95	3.23
Collaboration	Domestic	0.19	0.62	0.39	0.95
	Foreign	0.43	1.21	1.01	3.32
	Total	0.38	1.11	0.84	2.87
Funding	Domestic	0.12	0.48	0.26	0.60
	Foreign	0.43	1.16	0.71	1.19
	Total	0.36	1.05	0.58	1.08
Projects	Domestic	0.11	0.67	0.82	2.57
	Foreign	0.21	0.72	0.54	1.23
	Total	0.19	0.71	0.62	1.72
Publications	Domestic	0.58	1.55	2.33	3.07
	Foreign	1.14	2.15	2.10	3.52
	Total	1.02	2.04	2.16	3.39
Conferences	Domestic	0.34	0.93	1.06	2.28
	Foreign	0.70	1.50	1.02	2.82
	Total	0.62	1.40	1.03	2.67
Notes	SD = Standard deviation				

### 6.13. Results of GEE analysis across academic ranks

The effect of a foreign doctorate on global engagement in research was examined across academic ranks for each of the global engagement dimensions. The GEE results showed a foreign doctorate positively affected international affiliations and also access to international funding (Table 6.8). The two dimensions supported the research assumption that study abroad doctorates would have higher rates of

global engagement than domestic graduates. Compared to domestic-trained doctorates Lecturers with foreign doctorates had 2.28 times more affiliations to international societies. Lecturers appear to maintain a more global orientation in affiliations following return and the links could be useful in establishing and maintaining contacts with other scholars. In the overall result, although foreign doctorates among lecturers maintained engagements higher than their national counterparts, they had no significant differences on most dimensions. Significant associations were however found across academic ranks for the different covariates of global engagement. Results for each of dimensions are explained in subsequent details by academic rank.

### ***International publications***

Results under publications suggest no association between a foreign doctorate abroad and international publications. Lecturers with foreign doctorates had a positive, substantive outcome in publication rate compared to domestic doctorates, but the difference was non-significant. On the other hand, results show that unlike a foreign doctorate, international collaborations had a strong correlation with international publications outcomes for lecturer category. International affiliation, projects, funding and conferences had no association with publications for lecturer category, but the object outcomes suggested positive patterns. Background characteristics including; age, gender, academic discipline, and education level had no significant outcomes in international publications for the lecturers.

The low rates in international publication outcomes for foreign doctorates were found to be in the professor category. Foreign trained professors compared to domestic, trained professors, had lower rates for international publications. The research hypothesis suggesting higher rates of international publications for a foreign doctorate was not supported. On the other hand, background characteristics particularly a postdoc education level and age. A postdoc experience and age characteristics had a positive correlation with international publications for professors. The substantive increase as a result of age was in itself very low. Meanwhile, a percentage increase in age had a negative outcome for international publications. Covariates including; affiliation and collaboration were positively associated with increased rates of international collaboration. Increased access to international funding and conferences had no impact on international publication rates for professors. Therefore, it might be argued that background characteristics and performance in other dimensions of research especially collaboration were more correlated with increased international publications rates than study abroad alone. The outcome is also an example of research dimensions where the outcome has little connections with study abroad expectations.

### ***International collaborations***

Even with the collaboration dimension, lecturers and professors had no differences within their categories arising from the award of foreign or domestic doctorates. Once more, the assumption that study abroad would increase levels of global engagement across academic ranks was not supported in the analysis. Within the

lecturer category alone, foreign trained lecturers would have an increase in average rates compared to domestic lecturers, but both outcomes were not significant. International collaborations were also found to be associated with background characteristics and other covariates. Academic discipline, especially faculty in the soft disciplines than hard disciplines would have reduced rates of international collaborations. International projects, conferences, and publications were positively associated with increased collaboration rates. Age, gender, education level and international had no significant correlations with international collaboration for the lecturer category.

For professors, the objective outcome for foreign doctorates compared to domestic doctorates a lower average rate though non-significant. It does not support the assumption that study abroad experience would be associated with increased outcomes in global engagement for research. On the contrary, covariates especially were relevant in explaining collaboration results for the professors. Additional international funding and international publications were expected to correlate with an increase in collaborations. Other covariates; age, age\*age, gender, academic rank, education level, academic discipline, international affiliations and conferences had no significant role with international collaboration for the professor category. Without overlooking the substantive outcomes of study abroad, results in the international collaboration dimension is one more case in where there is little support for study abroad outcomes in global research engagements.



### ***International funding***

In the international funding dimension, foreign doctorates comparatively had significantly higher rates of international funding than domestic doctorates across both the lecturer and professor category. The result had no support to the hypothesis that a foreign doctorate would have increased rates of global engagement. The result that foreign doctorates would on average have 2.87 times more access to international funding was not significant. Among the background variables for lecturers, a postdoc experience compared to a Ph.D. alone would correspond to an increase in international funding. Again in the lecturer category; international projects, and publications were associated with increased rates of international funding. Age, gender, academic discipline, international affiliation, conferences and collaboration had no significant association with access to international financing for the lecturers.

Like lecturers, foreign doctorates among professors had no significant differences in access to international funding compared to domestic doctorates. The increase in rates for international funding significantly correlated with international conferences. However, compared to the main analysis and even that of the lecturers, the remaining covariates including the background characteristics had no significant correlation with international funding in the professor category. Age, gender, academic discipline and education level all had no association with international funding outcomes. Likewise, international affiliation, collaboration, projects, and publications had no significant correlations with the results despite

suggestions of substantive increments associated with some of the dimensions. The outcomes for either the lecturers or the professors when examined separately, do not support the hypothesis that foreign doctorates would be more globally engaged than domestic graduates in the international funding dimension.

### ***International affiliations***

Affiliations equally had another positive result for foreign trained doctorates. The result was, however, significant for lecturers and not professors though both categories suggest increments in objective outcomes. The results indicate foreign trained lecturers compared to domestic-trained counterparts had 2.28 times more international affiliations. Among the control variables, conferences and publications were the only variables positively correlated with international affiliations in the model for lecturers. Collaboration, funding, and projects had no significant association with international affiliations for lecturers. The results further suggest that background characteristics were also had no correlation with international affiliation outcomes for lecturers.

The results in the professor category were different. The outcomes were not significant for a foreign doctorate among the professors although the results were objectively higher in their favor. Considering the outcome, the study hypothesis that foreign doctorates would have increased international affiliations compared to the domestic doctorates had no support in the outcomes. International conferences, and publications were positively correlated with international affiliation rates. Meanwhile, international collaboration projects and funding by

surprise had no significant association with international affiliation rates. Even the background characteristics all had no link with international affiliation. Given the outcomes, a foreign doctorate would correspond to positive increments global engagements in the international funding dimension for lecturers but perhaps less for professors. The result further underscores the importance of study abroad in gaining international affiliations to professional bodies, particularly for the lecturer category.

### ***International projects***

In the international project dimension, no association in outcomes was found with a doctorate abroad. Compared to lecturers with a foreign doctorate graduates had an increase in rates and professors with a foreign doctorate had lower average rates in international projects. Both were not significant and implied that the expectations of increased outcomes following a study abroad experience were not supported within the context of the current study. Particularly for the lecturers, even the background characteristics had no association with access to international projects. Likewise, affiliations, collaborations, and publications had no significant correlation with international projects for the lecturers. For the lecturers, the only significant covariates and with positive correlations were international funding and international conferences.

Professors also had no significant differences between foreign and domestic doctorates. However, the levels of international affiliation were positively correlated with increase rates in international projects for professors. The remaining

covariates all had no significant relationship with access to international projects. Covariates including; international collaboration, funding and conferences had promising objective outcomes but were non-significant. Therefore, the model illustrates another research dimension where study abroad outcomes do not differ by academic rank.

### ***International conferences***

It was also the assumption of the study that foreign doctorates would have higher rates of global engagements in the conference dimension than domestic doctorates. Results in the conference dimension of also revealed no significant differences between foreign doctorates and domestic doctorates for both lecturers and professor categories. In the lecturer category, being a postdoc, age appears to be linked to increasing in conference rates. A percentage increase in age would, however, be correlated with a decline in international conferences. The increase in affiliations, collaboration, funding and publications were also associated with increased presentations at international conferences.

Foreign doctorates among professors dropped in engagements in international conferences compared to domestic graduates. The result was not statistically significant and therefore suggest no association between a doctorate abroad and conference rates among professors. Most covariates, however, had significant correlations with international conferences. Faculty in the soft disciplines were more likely to present at international conferences than faculty in the hard disciplines. International affiliations, and funding were positively correlated with

international conference presentations among professors. Education level, age, international publications, collaborations, projects, gender, had no correlation with international conferences for professors. Therefore, other than the significant correlations with covariates, study abroad had little relationship with international conferences across academic ranks.

### ***Conclusions***

Overall, results of the analysis across academic levels revealed the impact of a foreign doctorate on international affiliations. Specifically, lecturers alone had significant differences in international affiliation rates. Although Lecturers had significant differences in affiliations to international societies, results on most of the remaining dimensions were not significant though substantive difference existed between foreign and domestic doctorates within both the lecturers and professors. However, the result also suggested that global engagement across academic ranks was affected by background factors and other dimensions with correlated outcomes.

Table 6.8: GEE table for outcomes across academic ranks (N=795).

Variable	Publications		Collaborations		Funding		Affiliations		Projects		Conferences	
	Lecturer	Professor	Lecturer	Professor	Lecturer	Professor	Lecturer	Professor	Lecturer	Professor	Lecturer	Professor
foreign <sup>a</sup>	1.521 (0.528)	0.761 (0.225)	1.121 (0.499)	0.923 (0.461)	2.874 (1.914)	2.730 (1.760)	2.279* (0.866)	1.191 (0.469)	1.008 (0.775)	0.512 (0.465)	1.511 (0.571)	0.753 (0.318)
Age	1.209 (0.170)	2.006*** (0.392)	0.982 (0.142)	1.918 (0.830)	1.350 (0.427)	1.195 (0.357)	1.066 (0.233)	0.949 (0.209)	0.731 (0.224)	2.209 (1.671)	1.624** (0.248)	1.243 (0.313)
age*age	0.998 (0.002)	0.993*** (0.002)	1.000 (0.002)	0.994 (0.004)	0.997 (0.003)	0.997 (0.003)	0.999 (0.002)	1.000 (0.002)	1.003 (0.003)	0.992 (0.007)	0.995*** (0.002)	0.998 (0.002)
Male <sup>b</sup>	0.801 (0.189)	0.997 (0.295)	0.719 (0.228)	1.929 (1.409)	0.907 (0.474)	0.588 (0.385)	0.833 (0.275)	0.803 (0.284)	1.849 (0.941)	1.643 (1.467)	0.790 (0.232)	1.248 (0.645)
Discipline <sup>c</sup>	1.190 (0.332)	1.293 (0.300)	0.372** (0.134)	0.599 (0.301)	1.224 (0.541)	0.436 (0.194)	0.691 (0.222)	1.361 (0.467)	0.531 (0.218)	0.254 (0.265)	1.104 (0.293)	2.660* (1.309)
Postdoc <sup>d</sup>	0.779 (0.202)	2.148* (0.740)	1.209 (0.360)	0.367 (0.220)	2.677* (1.182)	1.218 (0.668)	1.335 (0.400)	1.274 (0.623)	1.582 (1.006)	0.735 (0.705)	2.620*** (0.747)	1.439 (0.672)
Affiliations	1.068 (0.051)	1.041 (0.035)	1.018 (0.076)	0.922 (0.067)	1.145 (0.098)	1.074 (0.063)			1.046 (0.117)	1.188* (0.090)	1.218*** (0.060)	1.088* (0.039)
Collaborations	1.466*** (0.086)	1.275*** (0.035)			1.058 (0.082)	1.051 (0.068)	0.952 (0.089)	0.954 (0.040)	1.114 (0.163)	1.146 (0.084)	1.150 (0.083)	1.188*** (0.062)
Funding	1.092 (0.108)	1.021 (0.0712)	1.111 (0.0796)	1.181 (0.107)			1.082 (0.0941)	1.079 (0.0916)	1.535*** (0.152)	1.155 (0.211)	1.148* (0.0800)	1.374** (0.157)
Projects	1.053 (0.125)	1.022 (0.038)	1.310** (0.128)	1.084 (0.061)	1.477*** (0.169)	1.016 (0.090)	1.146 (0.145)	1.093 (0.052)			1.526*** (0.135)	1.053 (0.082)
Conferences	1.074 (0.083)	1.040 (0.027)	1.192** (0.065)	1.050 (0.038)	1.124 (0.073)	1.095** (0.038)	1.177*** (0.049)	1.062* (0.032)	1.306** (0.123)	1.085 (0.056)		
Publications			1.457*** (0.042)	1.362*** (0.053)	1.113* (0.053)	0.974 (0.044)	1.059 (0.038)	1.082** (0.031)	0.986 (0.098)	0.969 (0.062)	1.062 (0.042)	1.024 (0.055)
Observations	500	298	500	298	500	298	500	298	500	298	500	298

Notes: Exponentiated coefficients; Standard errors in parentheses; Starred = \* p<0.05; \*\* p<0.01; \*\*\* p<0.001  
Academic rank: Grouping variable composed of lecturer and Professor (Prof.) Categories.  
a = Category for a dummy variable award with domestic as the reference category.  
b = Category for a dummy variable gender with female as the reference category.  
c = Category for a dummy variable discipline with hard discipline as the reference category.  
d = Category for a dummy variable education with Ph.D. as the reference category.

#### **6.14. Analysis for study abroad outcomes on across gender**

Analysis across gender categories was done to examine the relationship between study abroad and global engagement across the female and male faculty. The aim of the analysis was to determine the gender categories of study abroad outcomes for the various dimensions of global engagement. The assumption was that foreign doctorates would be more globally engaged across both among male and female categories for each dimension of research. Study abroad was measured by having a doctorate from overseas, and domestic doctorates were the comparison group. The outcome measures were counts for the dimensions of research engagement. To test the assumption, a GEE analysis for each gender group was conducted across the six dimensions of research while controlling for individual characteristics. To better assess outcomes for each dimension, other dimensions were controlled during analysis on a specific dimension of interest. The results are presented below by dimension of research engagement and by gender following the descriptive statistics.

#### **6.15. Descriptive statistics**

Table 6.9 is a representation of means and standard deviations representation of results of a descriptive analysis of study abroad outcomes in the research dimensions for both male and female faculty categories. Among male faculty, foreign doctorates were on average more globally competitive than domestic male faculty except in the project dimension. Among the female faculty, foreign

doctorates were on average stronger in projects and funding but weaker on the other dimensions compared to domestic doctorates. However, there were signs of strong dispersion for affiliations, publications, and conferences across categories.

Table 6.9: Descriptive table for engagements across gender by award (N=795).

Engagement Outcomes	Award	Gender Category			
		Male		Female	
		Mean	SD	Mean	SD
Affiliation	Domestic	1.51	2.88	2.16	2.28
	Foreign	2.08	2.64	1.82	2.56
	Total	1.93	2.71	0.65	2.51
Collaboration	Domestic	0.27	0.81	0.29	0.69
	Foreign	0.77	2.53	0.24	0.54
	Total	0.64	2.22	1.18	0.57
Funding	Domestic	0.14	0.43	0.34	0.85
	Foreign	0.58	1.20	0.37	1.08
	Total	0.47	1.07	0.11	1.04
Projects	Domestic	0.51	1.97	0.05	0.32
	Foreign	0.39	1.05	0.12	0.47
	Total	0.42	1.35	0.37	0.44
Publications	Domestic	1.35	2.63	1.26	1.70
	Foreign	1.58	2.92	1.16	2.13
	Total	1.52	2.84	0.25	2.05
Conferences	Domestic	0.59	1.56	0.87	2.16
	Foreign	0.89	2.26	0.59	1.34
	Total	0.81	2.10	1.89	1.54
Notes	SD = Standard deviation				

### 6.16. Results of the GEE Analysis of outcomes across gender

Although the assumption was that doctoral graduates from abroad would have higher rates of global engagement in each gender category for all dimensions of research, the results showed differences within the gender categories were mainly in funding and affiliations (Table 6.10). Even then, the differences were only



significant among males and not among the female faculty. Compared to the domestic doctorates, foreign trained male faculty were on average accessed 4.39 times more international funding. Study abroad, therefore, appears to be more rewarding for the men than the women in access to international funds. A foreign doctorate had no gender aspect in the other five dimensions of research; international publications, collaboration, affiliations, conferences, and projects. Details of model outcomes for each research dimension are presented by gender category.

### ***International publications***

Under international publications dimension, foreign trained females doctorates compared to domestic had no significant differences. However, there was a large substantive difference between the two groups suggesting a foreign doctorate would correspond to increased outcomes on publications among female faculty despite being non-significant. In the control variables, age, age\*age, and academic rank remained significantly associated with publication outcomes. Faculty at a young age had increased international publication rates, but a percentage increase in age\*age was associated with a decrease in publications. International collaborations and funding still had a positive relationship with international publications. Academic rank and the rest of the control variables had no significant association with the international publication for the female category.

Among the male faculty, there was no difference between foreign and domestic doctorates international publications. The difference according to the results was

neither substantive nor significant. Control variables; age, age\*age, academic rank, academic discipline and academic level were associated with international publication rates. Like for females, faculty at a young age would have an increase in publication rates but decline following a percentage increase in age (age\*age). Professors compared to lecturers would be linked with an increase in publications. Similarly, faculty in the soft disciplines than hard disciplines would also have increased in publication rates. Results in the research dimension showed collaboration and affiliation being associated with increased publication rates. Education level had no correlation with outcomes on international publication. Like in the baseline analysis, control variables belonging to the research dimensions including; funding, projects, and conferences still had no association with international publication among male faculty. Therefore, no differences were found between foreign and domestic doctorates even when each gender category were analysed separately.

### ***International collaborations***

Like in the male category, a foreign doctorate among female faculty had no significant outcomes in international collaboration. Moreover, the substantive result suggested foreign doctorates would have a correspondingly lower average rate for international collaborations compared to domestic doctorates. International publications correlated with international collaboration. International publication had a positive correlation, while international projects were associated with a surprising decline in collaboration. The rest of the control variables non-significant. Age, academic rank, academic discipline and academic level had no association

with international collaborations outcomes for females. Similarly, international funding, affiliations, projects and conferences had no significant relationship with international collaborations for the female category. According to the results, a foreign doctorate would be less helpful for females in terms of international collaborations.

For males, the result was still no significant. The substantive outcome suggests an increase in international collaboration outcomes. It contrasts with the expected lower annual rate of outcomes for the female category. Control variables associated with research engagement; funding, projects, conferences and publications were all significantly associated with increased international collaborations for the male faculty. The correlation of variables with international collaboration was more among males than among females. Faculty in the soft disciplines would have a significantly lower average rate in international collaboration compared to faculty in the hard disciplines. Other control variables; age, academic rank and education and affiliation had no correlation with international collaboration for male faculty.

### ***International funding***

Compared to domestic doctorates, foreign doctorates had substantive increments in international funding. In the female category, the differences in access to international funding were not significant. For the control variables, significant increases in international funding were associated with among academic rank (professor), and international projects. Age, academic discipline, education level

were not related to international funding outcomes among females. Likewise, international collaboration, conferences, affiliation, and publication had no association with international funding despite associated substantive increments in the financing results for females.

In the male category, an important and significant difference was for foreign doctorates was found among males in terms of international funding. Contrary to the female faculty, control variables; age and age\*age were significantly associated with funding. An increase in age for would correlate with improved access to funding while a percentage increase would correspond to a decline in access to international financing. A postdoc, additional international affiliations and international conferences were associated with enhanced international funding. Other variables in the model; academic discipline, academic rank, collaborations, projects and publications had no significant correlation with international financing within the male faculty category. More variables were associated with outcomes in the male category than the female category.

### ***International affiliations***

Foreign doctorates had higher substantive differences compared to domestic doctorates but only significant in the male category. In the female category, in particular, the outcomes on international affiliations were not significant and therefore no correlation with a foreign doctorate. Unlike in the main analysis, control variables; age and age\*age had a significant impact on international affiliations for females. Age was linked to an increase in affiliation rates and a

percentage increase in age (age\*age) correlated with a decline in international affiliations, and the associations were strong significance level. Meanwhile, being a professor compared to a lecturer would be associated with an increase in affiliations. Similarly, international collaboration would correspond to increments in international affiliations. Postdoc experience, participation in international projects, funding, and conferences and publications had no significant correlation with international affiliations for the female category.

Even among the male faculty, the foreign doctorates had no significant difference in international affiliations when compared to domestic faculty. Foreign faculty would have higher average rates than the domestic faculty but the result had no statistical significance. Professors still had significantly higher affiliation rates compared to lecturers. Most variables associated with dimensions of research engagement including; funding, projects, conferences and publications were all positively related to international affiliations. They had more positive associations with affiliation in the male category than in the female category. However, international collaborations, were by surprise related to a decline in international affiliation among male faculty. Age, academic discipline, education level, international funding and projects had no significant association with international affiliation in the model. International affiliation also falls under dimensions where a foreign doctorate makes no significant difference for both men and women.

### ***International projects***

In determining the outcomes of a foreign doctorate across gender categories, no differences were found either among males or females. Results showed non-significant outcomes on international projects. Among females, in particular, there was a substantive increase for the foreign doctorates but was non-significant. This was contrary to the main outcome showing lower rates in international projects. Though both were non-significant, it reflects a variation in outcomes among females. Control variables; especially age, were correlated with international projects. The coefficient for age was out of range, and the standard error was too large to offer meaningful estimates. A similar problem concerning an abnormally large coefficient and standard error was found in the correlation between a postdoc experience and international projects. However, a percentage increase in age (age\*age) was linked with a decline in affiliations and estimates were somehow meaningful compared to age and postdoc estimates. Academic rank and discipline had no links with international projects. Likewise, international affiliation, collaboration, conferences, and publications had no significant correlations with work in international projects for the female category. International affiliation, collaboration, and funding were significant in the main analysis before grouping data and therefore, the outcome of the analysis suggests a big difference in relationships with a gender perspective.

In the male category, foreign doctorates had no significant association with international projects. The assumption that foreign doctorates would perform better had no supporting evidence in the results. The substantive outcomes, however, showed a lower rate in international projects for foreign doctorates compared to

domestic doctorates but were not significant. Among control variables; affiliations, collaborations, funding and being a professor were all correlate with increased work in international projects. Age, academic discipline, academic rank, and education level were not correlated with outcomes in international projects. Furthermore, international publications, collaborations and funding also had no significant relationships with access to international projects for the male category. The difference with the female category is that males have more significant control variables and therefore mirror results of the baseline analysis.

### ***International conferences***

While foreign doctorates were expected to have higher rates of presenting at international conferences across gender, the results showed no differences between foreign and domestic doctorates in international conferences for both males and females. Considering the model for female faculty alone, the substantive outcome was even negative for foreign doctorates in addition to no significant difference in international conference presentations. Affiliation and collaboration were associated with significant increases in conference presentations. Age was a significant control variable predicting an increase in presentations. A percentage increase in age would have no correlation with international conference presentations. Besides, all the remaining control variables including; academic rank, academic discipline, and education level had no correspondence with outcomes. Other covariates; international funding, projects, affiliation, collaboration and publications had no significant association with

international conferences. International funding, projects, and publications covariates found significant in the baseline analysis were no longer significant for the female faculty.

Among the male faculty, there was still no difference in rates of participation at international conference between foreign doctorates and domestic doctorates. Compared to the female category where foreign doctorates had lower rates in average rates, the substantive outcome for the males suggests an increase in for the foreign doctorates. Most of the control variables positively correlated with international conferences. A postdoc experience, had a positive correlation with international conferences. Similarly, affiliation, funding, collaboration, and projects were positively associated with international conferences. On the other hand, age, academic rank, academic discipline and international publications had no significant correlation with international conferences.

### ***Conclusions***

The results indicate that, within the specific gender categories, a foreign doctorate would be associated with differences in the funding and affiliation dimensions of research engagements. Most especially, the correlations were significant for the male category than the female category. For females, non-significant differences for foreign doctorates were found in all dimensions except collaboration and conferences. The foreign doctorates in the male faculty category only had less in the dimension of international projects. Overall, therefore, study abroad could be



associated with dimensions of global engagement in research but is far more among the males than females.

Table 6.10: GEE table for engagement outcomes across gender categories (N=795)

Variable	Publications		Collaborations		Funding		Affiliations		Projects		Conferences	
	female	male	female	male	female	male	female	male	female	male	female	male
Foreign <sup>a</sup>	1.438 (0.364)	1.005 (0.289)	0.891 (0.522)	1.300 (0.534)	1.448 (1.181)	4.394** (2.282)	1.065 (0.420)	1.698 (0.587)	1.492 (1.437)	0.600 (0.413)	0.878 (0.481)	1.208 (0.392)
Age	1.971** (0.456)	1.526** (0.197)	1.147 (0.301)	0.805 (0.124)	1.397 (0.599)	1.527* (0.297)	1.997*** (0.382)	0.816 (0.113)	26.98** (27.39)	1.160 (0.423)	1.888 (0.707)	1.145 (0.160)
Age*Age <sup>b</sup>	0.993** (0.002)	0.995*** (0.001)	0.998 (0.003)	1.002 (0.002)	0.995 (0.005)	0.995* (0.002)	0.993*** (0.002)	1.002 (0.002)	0.971*** (0.008)	0.998 (0.003)	0.994 (0.004)	0.998 (0.001)
Professor <sup>c</sup>	2.101 (0.914)	2.083** (0.545)	0.327 (0.208)	1.131 (0.344)	7.354** (4.740)	1.706 (0.657)	11.75*** (5.103)	2.746** (0.887)	0.484 (0.631)	3.187 (1.980)	1.269 (0.654)	1.314 (0.427)
Soft discipline <sup>d</sup>	0.904 (0.343)	1.223 (0.274)	1.373 (0.658)	0.340** (0.132)	1.003 (0.827)	0.546 (0.171)	0.238*** (0.0983)	1.137 (0.296)	0.201 (0.177)	0.302 (0.191)	0.824 (0.451)	1.623 (0.451)
Postdoc <sup>e</sup>	0.741 (0.252)	1.405 (0.320)	1.668 (0.836)	0.874 (0.260)	1.574 (1.351)	1.916* (0.635)	0.484 (0.246)	1.746 (0.510)	32.93** (44.43)	0.984 (0.606)	1.639 (1.041)	2.450** (0.696)
Affiliation	1.006 (0.059)	1.080* (0.035)	1.149 (0.087)	0.944 (0.065)	0.794 (0.119)	1.158** (0.064)			1.243 (0.224)	1.177* (0.078)	1.140 (0.091)	1.125*** (0.039)
Collaboration	1.828*** (0.212)	1.281*** (0.047)			1.606 (0.564)	1.023 (0.063)	1.520* (0.266)	0.918* (0.034)	0.511 (0.349)	1.125 (0.085)	1.579 (0.390)	1.155*** (0.050)
Funding	1.179* (0.079)	1.002 (0.051)	1.132 (0.131)	1.238** (0.094)			0.718 (0.122)	1.161* (0.085)	3.279** (1.275)	1.252 (0.162)	1.090 (0.129)	1.263*** (0.087)
Projects	1.133 (0.306)	1.024 (0.034)	0.391 (0.191)	1.157** (0.065)	2.249** (0.649)	1.095 (0.093)	1.149 (0.216)	1.097 (0.053)			1.341 (0.313)	1.142* (0.077)
Conferences	1.019 (0.047)	1.040 (0.032)	1.114 (0.092)	1.075* (0.034)	1.081 (0.104)	1.120*** (0.036)	1.069 (0.047)	1.101** (0.040)	1.028 (0.115)	1.094 (0.051)		
Publications			1.365*** (0.096)	1.378*** (0.035)	1.041 (0.048)	0.989 (0.034)	0.967 (0.039)	1.108*** (0.028)	1.037 (0.103)	0.960 (0.063)	0.990 (0.059)	1.045 (0.043)
Observations	186	612	186	612	186	612	186	612	186	612	186	612

Notes: Exponentiated coefficients; Standard errors in parentheses; Starred = \* p<0.05; \*\* p<0.01; \*\*\* p<0.001  
Gender: Grouping variable consisting of female and male categories.  
a = Category for a dummy variable award with domestic as the reference category.  
b = quadratic (age squared) for the age variable.  
c = Category for a dummy variable Academic rank with lecturer as the reference category.  
d = Category for a dummy variable discipline with hard discipline as the reference category.  
e = Category for a dummy variable education with Ph.D. as the reference category.

### **6.17. Summary of results for the Chapter**

In summary, this chapter which focused on assessing outcomes of a doctoral qualification abroad on global engagement in higher education research. The assumption was that foreign doctorates compared to domestic doctorates would have higher rates of global engagements across the six dimensions of research engagements. Data of research engagements for foreign doctorates and domestic doctorates were compared while controlling for potential covariates. A baseline GEE analysis was applied. Followup analyses to determine categories of outcomes had three secondary analyses for global engagement across involving education levels, academic disciplines, and academic ranks. Results of the analysis were presented and summarized accordingly.

When the results of the main analysis were examined, a correlation was found between study abroad and global engagement. Having a foreign doctorates had a positive and significant association with global engagement in international funding. Foreign doctorates had higher rates of access to funds from international agencies than faculty who obtained domestic institutions. The correlation was reflected across various levels of the analysis including; education level, academic discipline, academic ranks, and gender.

A secondary analysis across education levels was done on the assumption that a doctorate abroad would be linked to increasing in global engagements for both Ph.D. and postdoc groups of faculty across all the dimensions of research

engagement. The results showed differences in global engagements among faculty with foreign Ph.D. compared to their corresponding domestic counterparts had greater rates of access to international funds than domestic graduates. Also, foreign doctorates with postdocs compared to domestic counterparts with postdoc experience had lower rates of engagement in international projects and conferences. The study assumption found more support among Ph.D. than among postdocs.

Across academic disciplines, the study assumption was that foreign doctorates would have higher rates of global engagement in research across both the hard and soft disciplines and for all the dimensions of research engagement. The results revealed that differences involving foreign doctorates accessing more international funding were found in the soft disciplines rather than in the hard disciplines. In the international affiliation dimension, foreign-trained faculty in the hard disciplines had more affiliations than domestic-trained faculty. Moreover, academic ranks also played an important role. Lecturers with foreign doctorates were more affiliated to international bodies than lecturers with domestic doctorates. At all levels of analysis, no differences were found among faculty on collaborations. Performance on collaboration is quite odd as foreign doctorates would be expected to perform better considering the social capital that would come with study abroad experience.

Another analysis was conducted across the gender categories. The assumption that foreign doctorates would have higher rates of global engagement in research within across male and female categories and for all the dimensions of research

engagement guided the analysis. Within the gender categories, results suggest that males with foreign doctorates were more likely to have higher levels of global engagement in the international funding dimension. The outcome for male faculty supports the assumption that foreign doctorates would have increased levels of global engagement than domestic doctorates in on only the funding and affiliation dimensions. Although females with foreign doctorates also had increased outcomes in the same funding and affiliation dimensions, none was significant.

On the other hand, background characteristics in the analysis were found to be associated with global engagement in most of the analysis. In particular, age, academic ranks, education level and gender were associated with changes in levels of global engagement across various levels of analysis. Age correlated with publications, collaboration, funding, and conferences. The effect was negative and affected mainly faculty in the professor category. However, professors and associate professors were more globally engaged compared to lecturers and senior lecturers, and the difference was significant in many respects. At the education level, a postdoc experience for faculty with a foreign doctorate was found to add value to global engagement, especially on publications, affiliations, and projects. However, gender did not have any effect on levels of engagement. Differences were only found in international projects where males participated more than the females.

The relationship among dimensions of global engagement was also examined. The results found correlations among the outcome measures. The analysis

reflected positive correlations among the results with suggestions that an increase in some of the outcomes probably creates more opportunities for engaging with others. This correlations would be expected because the dimensions all measure the same construct of research engagement. It justified the need to control for their influence in determining outcomes of study abroad on one dimension of research engagement. However, one case had strange outcomes. The correlation between collaboration and international affiliations turned out different.

A surprise in the results was the relationship between collaboration and affiliations. It suggests a decline in affiliation for an increase in collaboration. The same relationship was examined in further analyses and was also found to be linked with faculty having Ph.D. (no Postdoc), in the hard disciplines, and belonging to the professor category. The perceived relationships need further investigation. For the rest of the outcome variables, positive correlations were noted. An increase in one outcome variable would likely be linked to an increase in another outcome variable.

## **6.18. Discussion**

The study aimed at examining whether study abroad experience was relevant in determining progress on global engagement for higher education faculty in higher education. Higher education faculty with a doctorate abroad and a doctorate at home were compared across dimensions of global research engagement involving international publications, projects, collaborations, conferences, affiliation, and funding. The potential influences on outcomes were controlled. The results showed that study abroad had a positive correlation with global engagement particularly

international funding dimension. It suffices to point out that even the remaining dimensions reflected a positive relation with study abroad despite the non-significant outcomes. The only exception in favour of domestic graduates was in international publications. Despite being non-significant, some of them were substantively large enough to be of interest. Further analysis showed that differences existed at the education level, academic discipline, and academic ranks, especially in the project dimension. Although the research interest was different, the correlation among the dimensions of research engagement was an interesting aspect of the study. Details of the results are discussed by the dimension of research engagement.

### ***International funding***

Theoretically, faculty with a doctorate abroad would be more productive than domestic doctorates in global engagement. After all, the assumption sits well with findings of studies suggesting that those who studied abroad are more likely to have contacts abroad than those who studied at home (Kyvik & Larsen 1994). However, they also found that extended stays abroad did not correspond with an increase in international publications. Their findings suggest that study abroad per se does not count but rather it is the number of contacts made that will matter in international production. This position is in tandem with results of the current analysis that found no association between study abroad and international publication. Related studies on overall academic productivity also maintain the position that study abroad has no correlation with productivity. Moreover, for some

of the studies, the substantive evidence is still in favour of domestic doctorates (Shin, Jung & Azman 2014). Arguably, the international publication dimension needs to be understood as one of the dimensions of research engagement. Faculty, therefore, could better be assessed by considering the full length of dimensions of engagement to determine their overall international productivity. The emphasis on publication tends to overshadow other dimensions of research, and yet they could in turn further illuminate changes in publication rates. More important is that there is still need to demonstrate further in a significant way the importance of the experience of a doctorate abroad across all the dimensions of international research engagement.

The current analysis found differences in international funding outcomes international publication, affiliation, and project dimensions across educational qualifications. Changes in outcomes occasioned by a postdoc experience would be understandable, but it becomes interesting when either significant differences or no differences are found between foreign and domestic doctorates among the faculty of the same qualifications. There could be many hypotheses for the outcome. It could mean that for a postdoc taken abroad, faculty with a doctorate abroad would find it easier to cope with life and education systems abroad than domestic graduates and therefore benefit more from the experience than domestic graduates. Obviously, the postdoc experience for tenured faculty is usually short and may not be sufficient for establishing research contacts for future engagements. Whatever reason, results of the analysis suggest a postdoc experience is valuable for improved international participation. Perhaps for



domestic doctorates, a postdoc abroad would be more critical in enabling them to make contacts for future global engagements. On the hand increased collaborative research by institutions might facilitate faculty contacts and pave the way for individual collaborations.

Differences in access to international funding were tracked within academic disciplines and found to be in both the hard and soft disciplines. The competitive nature of grant writing might explain the favor that study abroad graduates find. Grant agencies might prefer contracting those whom they trust and find culturally competent to work with international partners. The same was echoed by Norwegian studies that study abroad graduates were more likely to find employment that could be described as international (Wiers-Jenssen 2011). Within the hard disciplines, the universal and codified nature of the hard disciplines creates opportunities of universal competitiveness of faculty (Kyvik & Larsen 1994). Additionally, the high specialization within the sciences and the need for a specific specialization opens opportunities for all faculty irrespective of the study backgrounds especially with improving communication technology as predicted by Friedman's flat world theory.

### ***International collaborations***

Objective differences were evident between study abroad and domestic doctorates. The foreign doctorates were on average more engaged in international collaborations than national graduates. This outcome was also evident in the hard

disciplines, among doctorates and postdocs, and also among professors and lecturers. Such patterns of collaborations could arise due to many factors.

Foreign doctorates including the postdocs both collaborated more internationally than their domestic counterparts. Collaboration at an international level requires contacts abroad. It would be natural that those who studied abroad are expected and have more contacts than domestic graduates (Kyvik & Larsen 1994). This pattern appears evident particularly in the hard discipline. Considering that its collaboration was more in the hard disciplines again appeals to the standardization in the hard disciplines which allows for greater collaboration with the international community. Furthermore, the need to share research equipment and even research sites increases chances for collaboration (Melin and Persson 1996). Small countries such as Uganda have inadequate resources required to fund all kinds of research and specialized equipment needed in all disciplines especially in the hard sciences that require such equipment. Therefore it is more than expected for collaboration to be more successful in such disciplines than in the soft disciplines. The implication is that it is apparently much easier to forge international collaborations for the hard disciplines than soft disciplines, and it could be a way of boosting global engagement in research.

For the education level, the objective result indicated that those who had a doctorate abroad collaborated more with international counterparts than the domestic graduates. The only difference, even among the study abroad graduates was that, those who had received postdoc training turned out to be more engaged

than in the doctorate group. The outcomes not only reinforce the importance of a doctorate abroad but also the importance of a postdoc experience in increasing levels of global collaboration.

Within the academic ranks, the objective result was that both the professors and lecturers who studied abroad collaborated globally more than those who did not study abroad. The high rate of outcomes for study abroad suggests the importance of the overseas study. Furthermore, professors might appear as a select group of faculty who happen to benefit from a reward system for the more productive. A generational analysis could illuminate this issue further. A positive reward system for productivity indirectly motivates international collaboration.

### ***International affiliations***

Affiliations provide an academic with many engagement opportunities. The results showed substantive differences in favour of a doctorate abroad. In terms of education level, academic discipline, and academic rank, the differences across categories were strong and with differences among the postdocs and lecturers being significant. The implication is that studying abroad increases opportunities of gaining membership in international professional societies. While studying abroad, students are exposed to international societies during the time for paper presentations or attend conferences relevant to the specialisation; domestic students rarely have much exposure to such associations. Following course completion abroad, it is likely that study abroad graduates continue renewing membership to international societies. However, the domestic graduates would

remain with limited international memberships (if any). The low membership rates are compounded by the possible lack of awareness about the importance of affiliations to professional advancement (see Pan and Zhang 2013). Moreover, the importance of international affiliation corroborates the current study findings that affiliation rates positively correlate with all the other dimensions of global research engagement.

The implication is that both domestic and foreign graduates might have to acknowledge the importance of international affiliations as one useful way to gain international linkages for global engagement. Study and employing institutions could have a role in laying emphasis on affiliation. Highlighting affiliations for doctoral students in a future career in higher education might improve levels of global engagement. Besides it might useful making deliberate efforts to support internationalisation through such profession societies.

### ***International projects***

In the international projects, results show that there were no significant differences between domestic graduates in both the hard and soft disciplines. Therefore, decisions about what disciplines to send for study abroad would be non-effective as a mechanism to improve participation in global projects. However, it may only serve to raise average participation rates in the soft disciplines than hard disciplines. Getting postdoc experience for a foreign doctorate would surprisingly mean less involvement in global projects. Within the academic disciplines, low project rates were more pronounced in the hard disciplines that soft disciplines.

The soft disciplines maintained a higher average despite having no significant difference.

An appeal to the argument of standardization in the hard disciplines might shade light on the low performance in international projects by the foreign doctorates (Kyvik & Larsen 1994). Professionally competent academics in the hard disciplines could be considered for projects of their specialization and therefore given opportunity, and therefore even domestic graduates could easily get the chance. For the soft disciplines have a more diverse methodology and the concerns more often tend to be more localized than in the hard disciplines. Therefore, postdoc training needs have to identify specific disciplines where the postdoc training would make a difference in international projects. While there might be several explanations, study abroad needs to prepare academics better with skills needed to be global citizens and enhance chances of learning through global projects. A more detail disciplinary analysis is required to identify specific disciplines that would advance global engagement in projects. Following a return to the country of origin, there is a need to the enabling environment that sustains focus on the development of academic career rather than private consultancy.

### ***International conferences***

Conference participation like many other dimensions had no significant outcomes linked to study abroad, but the objective differences were large enough to capture attention. The fact that foreign doctorates on average presented more at international conferences than domestic graduates is an important aspect of global

engagement. The explanation for the trend was linked to international affiliation. Foreign trained lecturers had a significantly higher rate of international affiliation than the domestic graduates. Moreover, the correlation between affiliation and conference participation was positive and very significant. This positive correlation was not only across academic ranks but also across academic disciplines and education levels. Affiliation to professional associations provide information on upcoming conferences and at times provide moderate rates for members (Good 2005). Therefore, affiliation better explains increased conference participation by study abroad graduates.

Conferences being forums for knowledge sharing (Kyvik & Larsen 1994), attract those doing basic research other than consultancies. In keeping with the argument by Kyvik and Larsen, it is reasonable to suggest that those more committed to consultancy than basic research may be less 'attractive' to merit invitation by conference organizers despite even being affiliated members of many international societies.

Age and research dimensions including; funding, affiliation, projects, and collaborations have a greater impact on outcomes than the study abroad experience. Although study abroad has no significant relation with conference participation, the difference between study abroad and domestic doctorates is large. Besides, changes in conference participation correlate with changes in other dimensions of research and demographics.

### ***International publications***

Foreign doctoral graduates from abroad generally have no difference with domestic doctorates in international publications. However, following a postdoc experience, they turn out to publish more than domestic doctorates. There could be more than one explanation for this outcome. Foreign trained graduates have greater success in international funding. Access to international financing might reduce on time for basic research and publication. The argument gains credence in findings that the Ugandan higher education research talent in East Africa and especially in Uganda is on hire and spend more time in consultancies (Wight, Ahikire, & Kwesiga 2014). Aware that publishing in the context of consultancy could face restrictions placed on publication by the funders and therefore negatively impact on publication rates for faculty engaged in consultancy. Moreover, the deep involvement in consultancies is being justified by academics on the grounds of limited resources for research and low pay. Addressing concerns over researching and low pay might partly contribute to faculty balancing their research engagements in ways beneficial to themselves and employing institutions.

In the academic disciplines, foreign doctorates published internationally than domestic doctorates in the soft disciplines but were weaker in the hard disciplines. Kyvik & Larsen, argue that publications in the hard disciplines are by their very nature international. Therefore, scientists have less choice about where to publish except international journals. The outcome that foreign doctorates in the hard disciplines could be more involved with consultancies could partly explain the lead by domestic graduates in publications. The soft disciplines only the hand often

have a national character and in such respect may appeal more to the national than international audiences. Therefore they are more likely to be published in forms accessible to an appropriate audience. Such forms might include local institutional or professional journals and in some cases, indigenous national or regional languages. It might, therefore, be argued domestic doctorates in soft disciplines could be publishing more for the local audience. Besides, research in the soft disciplines is not as standardized as in the hard disciplines, and little exposure to the international publication dynamics could complicate possibilities for publication in a highly competitive environment. The results, however, suggest the importance of postdoc training and could, therefore, be one way to develop and strengthen global engagement in the soft disciplines.

Assessing by academic ranks, foreign trained doctorates at the rank of lecturer on average had more international publications than their domestic trained counterparts. At the lecturer level, it is understandable that faculty are at the stage of building their careers and publication in one way to gain promotion. It is, therefore, possible that those who trained abroad would be expected to continue publishing in foreign journals than those with domestic training. Professors with foreign doctorates, however, perform lower than their domestic trained colleagues. It challenges the notion that those who studied abroad are more likely to be globally engaged because they have the social capital necessary for such engagements. The low publication rates might be linked to international consultancies because the results also suggest increased access to international funding for professors with a foreign doctorate. International publication is not only a mark of quality and



brings credibility to the national education systems. However, foreign trained professors appear to have been overrun by global forces and invest more time in private gain at the expense of other research components of their careers. Obviously, consultancy within the context of weak reward systems drives faculty into areas perceived to guarantee better pay. On the other hand, the declining international publications also suggest a loss of social capital over the years. This aspect needs further investigation.

### ***Dimensions of global engagement in research***

The variables of interest in the study were study abroad and the outcomes. Covariates included dimensions of research. The study revealed correlations among research dimensions which partly explain the global engagement outcomes. Previous studies highlight the correlation between collaboration and funding (Katz and Martin 1993), publication and funding (Chudnovsky et al. 2008), funding and collaboration (Melin and Persson 1996; Ubfal & Maffiolib 2011), collaboration and publications (Lee & Bozeman 2005; Good 2005). The current analysis not only reflects on the outcomes of study abroad within the research dimensions but also shades light on the interrelatedness among the research dimensions.

The negative correlation between affiliation and collaboration was a surprise. Like other dimensions of research engagement, the outcome would be expected to be positively correlated. Increased affiliations would naturally provide access to more contacts and therefore potential collaborators. Perhaps the result could be an

artifact of the sample. On the other hand, measuring collaboration by taking co-authored publications could be suspect. This kind of measurement might only report partially on collaboration and thereby distort outcomes. Further investigations would be needed to explain the outcome further.

In determining the results on a single dimension, the analysis needs to be sensitive to the potential influence of the other dimensions considering the correlations among research engagement outcomes. The results also suggest the significance of making deliberate efforts to support initiatives that would boost international collaboration, affiliation, conference, publication, projects, and funding. Measures might take the form of encouraging faculty to partner in projects and accessing international funds; forge collaborates among staff and collaborations with institutions abroad as a way of bringing faculty closer and enhancing faculty mobility. Funds could be made available to support memberships to professional societies, travel for conferences and publications.

### **6.19. Conclusions**

Arguably, study abroad closely relates to global engagement in research. The impact is however limited to a few dimensions. Much of the influence on global engagement is contextual. Academics active in all dimensions of research would perhaps improve overall levels of global engagement. Concentrating on a few dimensions appears to undermine other dimensions because they are correlated. Meanwhile, the role of demographics needs to be acknowledged. Aging has a negative influence on publication and conferences but not on other dimensions.

The association between study abroad and global engagement is better reflected when seen across different levels of analysis and therefore provides a better framework for assessing research outcomes.

## **Chapter 7 : Study Abroad Factors and Specific Forms of Research Engagement**

### **7.1. Introduction**

The chapter aimed at utilizing data from the LCVA method to determine the study abroad factors associated with changes in the dimensions of global engagement outcomes in research. The analysis examined four factors of study abroad; destination, depth, duration and background demographics. The investigation tested the assumption that factors of study abroad correlated with dimensions of global engagement in research. Data extracted on the four dimensions and counts of outcomes for the dimensions of research and numerically recorded were subjected to statistical analysis. In the next section measures the Generalized Estimating Equation (GEE) analysis procedure used to analyze data is described and followed by the presentation of the results of the baseline model. The subsequent models consist of assessments of outcomes of study abroad factors by discipline and by gender to determine the consistency of results across categories. A summary section for the results precedes the discussion and with the last part covering debates and conclusion for the chapter.

### **7.2. GEE analysis procedure**

The negative binomial was fitted through the `xtgee` command available in GEE method of STATA 14 was applied. The analysis aimed at assessing destination, depth and duration as covariates of interest for their role in global engagement. Age, gender, education, and academic rank were included in the analysis were

covariates of interest. The analysis involved modelling each of the six forms of global engagement and determining predictors of the outcomes. The analysis, therefore, involved modeling outcomes on international affiliations, collaborations, conferences, funding, projects, and publications. In each of the models, the remaining five dimensions of research outcomes would be controlled in the analysis.

To illustrate the analytical procedure by taking international publications as an example of research specific forms of global engagement, the determinants of outcomes can be solved using the GEE equation in chapter 4 of this thesis. Assuming that the parameters of interest can be solved by taking the mean model for international publications to equal zero, the parameters of interest which include; destination, depth, duration, age of faculty, experience, and gender can be determined by controlling for the remaining variables; international collaborations, funding, affiliations, projects and conferences. The model will also depend on the data correlation structure, the constant, the exposure time and the error term. The applied GEE equation model for international publications will be as below:

$$\begin{aligned}
 g(\text{International publications}_{ij}) = & \beta_0 + \beta_1 \text{depth}_{ij} + \beta_2 \text{duration}_{ij} + \\
 & \beta_3 \text{destination}_{ij} + \beta_4 \text{Age}_{ij} + \beta_5 \text{experience}_{ij} + \beta_6 \text{Gender}_{ij} + \\
 & \beta_7 \text{Academic discipline}_{ij} + \beta_8 \text{Academic rank}_{ij} + \beta_9 \text{Education level}_{ij} + \\
 & \beta_{10} \text{collabotions}_{ij} + \beta_{11} \text{funding}_{ij} + \beta_{12} \text{Affiliations}_{ij} + \beta_{13} \text{Projects}_{ij} + \\
 & \beta_{14} \text{Conferences}_{ij} + \text{Time} + \text{CORR} + \text{error}_{ij}
 \end{aligned}$$

During the analysis, numeric predictors; depth, duration, destination, and age were standardized to ease interpretation. The quasi-likelihood under the independence model Criterion (QIC) developed by Pan (2001) and available to STATA 14 as an add-on file for selecting the appropriate correlation structures was used. The QIC revealed the lowest values for exchangeable correlation structure for publications, projects, and conferences, while the autoregressive correlation structure was found suitable for international affiliations, funding, and collaborations. The exchangeable and autoregressive correlation structures had low values and therefore appropriate for the analysis (Cui 2007). Fitting xtgee command involved using the negative binomial with a log link, time as an exposure variable account for different times of joining faculty tenure and submitting CVs. for all outcomes. The negative binomial with robust standard errors was fitted using the GEE method for each of the six outcome dimensions of global engagement in research, and each output was reported and evaluated.

### **7.3. Results of the GEE analysis**

The GEE method was applied to determine the relationships between study abroad factors and affected global engagements research dimensions for higher education faculty while controlling the influence of demographics and other research dimensions on outcomes. During the analysis, the GEE coefficients were transformed into incident rate ratios.

The analysis revealed destination as the sole and significant factor of study abroad affecting global engagement (Table 7.1). Faculty with a background of studying in

the more developed destinations had 1.35 times more international collaborations than domestic doctorates. Choosing a study abroad destination on the basis of level of development as indicated by the HDI of the country would have some guarantee on the subsequent levels of global engagements for doctoral graduates. On the other hand, it could also have strong implications for recruitment of faculty with a view of raising institutional ranking. Surprisingly, depth and duration had no significant association with outcomes in other dimensions of research. Instead, demographics appear to have more impact on global engagement projects and conferences. Results are presented for each of the dimensions of international research engagement.

### ***International affiliation***

International affiliation appears to be the most affected by study abroad. All the three factors; duration, depth and destination had no association with outcomes on international affiliations. The suggestion is that no specific changes in study abroad factors would correspond to outcomes in international affiliation.

Among the covariates, age as a demographic factor had a negative outcome for affiliation rates, but faculty with more experience tended to have increased rates of affiliation. The implication might be that age would affect negatively, faculty with few years of experience. On the other hand, increased performance in international publications, international projects, and international conferences associated with an increase in international affiliations. Other demographics, gender, academic rank, and education level would have no link with international affiliation rates.

Therefore, faculty with longer study abroad durations especially at an early age could have higher rates of affiliation with suggestions for improved engagement given additional work experience.

As covariates for control, the relationship between international affiliation and other dimensions of research engagement was strong. Affiliations had positive relationships with most of the the other five dimensions of international research participation. Increments on publications, projects and conferences were positively correlated with affiliations. Funding and collaboration had no significant association with international affiliations. While study abroad factors apparently affect outcomes on affiliation, faculty demographics and increased activity in the covariates correlated with better performance in affiliation outcomes.

### ***International collaboration***

The outcomes of study abroad factors on international collaboration had significant correlations with International collaborations. Faculty who study in more developed countries were likely to have more collaborations than those who studied in less developed countries. Depth and duration had no association with international collaboration outcomes.

For demographics; age, gender and experience had no correlation with international collaboration outcomes. In the same was education level and academic rank of faculty had no correspondence with outcomes on international collaboration. Among covariates, most of the research dimensions positively correlated with collaboration. International publications, level of participation in



international projects, levels of collaboration, and access to international funding had increased rates of international collaboration. International affiliations and conferences had no association with collaboration. Under the collaboration dimension, therefore, destination had an association with collaborations. Depth and duration had no significant association with international collaboration.

### ***International funding***

In accessing international funding, no study abroad factor had a significant relationship with international funding rates. The implication being that no specific study abroad factor would suggest any potential outcomes international funding. Instead a combination of the factors is needed to explain outcomes.

Demographics showed relationships with international funding for higher education faculty. A postdoc experience, compared to faculty without such experience would significantly improve rates for funding. However, such positive developments on engagement would be undermined by age. Moreover, academics in the rank of lecturer compared to professors would have lower rates of access to international funds. Among the demographics, gender and experience had no association with funding rates. However, the study also observed increased funding rates correlating with performance in other dimensions of research engagement. The increase in projects and conferences significantly correlated with an increase in international funding rates. Publications, affiliations, and collaboration had no correlation with funding rates despite suggestions of positive correlations in the outcomes. Changes in international funding had links with duration, academic

rank, education level, projects, and conferences. Specific study abroad factors had no relationship with global engagement in the funding dimension.

### ***International publications***

Publication dimension had no connection with any of the study abroad factors. Other demographics; age, experience, gender, academic rank and academic level had no significant relationship with publications.

Among the international research dimensions, international collaboration and affiliations had a strong association with international publications. The implication is that, faculty who collaborated more, had higher international affiliations and more international publications. Meanwhile, international projects, international funding, and conferences had no association with changes in international publication rates.

### ***International projects***

Outcomes in the international projects dimension, were the same with the publication dimension. Study abroad factors had no significant correlation with international projects dimension. Faculty who studied in more developed countries would have low access to international projects. Meanwhile, duration and depth had no relationship with access to international projects.

For the demographics factors; gender suggests positive outcomes for males. Males compared to females, would have increased rates of engagement in projects. Also; age, experience, education level, and academic rank had no

association with international projects. The analysis revealed some dimensions of research engagement positively correlated with international projects. For instance; collaborations, affiliations, and funding were predicted to have a positive association with projects. Faculty with more access to international funding increased international affiliations and increased collaborations associated with corresponding increments in average rates of participation in international projects. Publications and conferences had no association with international projects. Age, collaboration, affiliation and funding and not the study abroad factors had links with access to projects.

### ***International conferences***

In the final dimension, depth, destination and duration, all had no significant association with outcomes in research. In the control variables, age, and a postdoc would be associated with an increase in rates for international conferences. On the other hand, additional years of experience would be related to declining rates of participation in conferences. Gender and academic rank had no association with international conferences.

Most dimensions of research correlated with participation in international conferences. For instance; international funding, affiliations, projects, and publications were positively correlated with increased international conference presentations. The implication being that faculty who are more active in such dimensions were also more likely to present at international conferences. However, collaboration had no correlation with international conference

presentations and implying that more international collaborations provide no clue about rates of participation in international conferences. Only depth, age and postdoc experience are associated with international conference engagements and therefore gives information on possible outcomes of conferences.

### ***Conclusions***

In concluding this section, the analysis aimed at determining the link between study abroad factors and dimensions of international research engagement. Among the specific factors of study abroad, only destination had a significant and positive outcome. Demographics play a significant role in many respects. Age, experience, academic ranks, education level, and gender partly explain changes in outcomes in some respects. Additionally, the study revealed strong correlations among the six dimensions of international research engagements. Funding, conferences, projects, publications, collaboration, and affiliations were for most outcomes positively correlated and therefore could mutually reinforce outcomes for one another. Assessments of outcomes of study abroad factors would need to take into account the potential influence of demographics as well as other dimensions of research.

Table 7.1: GEE table for impact of study abroad factors (N=795).

Notes	Variables	Collaborations	Publications	Projects	Affiliations	Funding	Conferences
<p>Exponentiated coefficients. Standard Error in parentheses. Significance values starred = * p&lt;0.05, ** p&lt;0.01, *** p&lt;0.001. a = Gender is a binary categorical variable with female as the reference category. b = Academic rank as a continuous variable. c = Education level is a binary categorical variable with a PhD being the reference category.</p>	Depth	1.242 (0.244)	0.852 (0.141)	0.837 (0.316)	0.702 (0.145)	0.819 (0.208)	1.282 (0.182)
	Duration	0.841 (0.136)	1.100 (0.155)	1.264 (0.412)	1.541 (0.373)	1.433 (0.279)	1.037 (0.168)
	Destination	1.345* (0.194)	1.012 (0.108)	0.669 (0.141)	0.880 (0.147)	1.138 (0.250)	0.845 (0.110)
	Age	0.968 (0.230)	0.787 (0.128)	0.634 (0.227)	0.690** (0.096)	0.564* (0.129)	1.486** (0.201)
	Experience	0.938 (0.031)	1.004 (0.027)	1.046 (0.049)	1.085*** (0.023)	1.041 (0.037)	0.883*** (0.023)
	Gender (male) <sup>a</sup>	1.134 (0.308)	0.952 (0.208)	2.971* (1.419)	0.780 (0.206)	1.037 (0.434)	0.785 (0.193)
	Academic rank <sup>b</sup>	0.997 (0.103)	0.948 (0.072)	0.970 (0.178)	0.994 (0.111)	0.763 (0.125)	0.912 (0.092)
	Education (postdoc) <sup>c</sup>	1.367 (0.325)	0.935 (0.222)	0.850 (0.453)	1.200 (0.384)	1.779 (0.619)	2.182** (0.574)
	Publications	1.355*** (0.031)		1.058 (0.062)	1.100*** (0.028)	1.063 (0.038)	1.079* (0.034)
	Projects	1.243*** (0.078)	1.071 (0.043)		1.093** (0.037)	1.236** (0.095)	1.190** (0.068)
	Conferences	1.073 (0.040)	1.027 (0.031)	1.043 (0.052)	1.149*** (0.035)	1.117** (0.047)	
	Funding	1.190** (0.066)	1.083 (0.069)	1.415*** (0.137)	1.074 (0.070)		1.294*** (0.080)
	Affiliations	0.992 (0.047)	1.104** (0.037)	1.166** (0.058)		1.070 (0.055)	1.228*** (0.036)
	Collaborations		1.268*** (0.048)	1.130 (0.087)	0.965 (0.041)	1.034 (0.059)	1.039 (0.039)

#### **7.4. Study abroad factors and global engagement across disciplines**

The aim of this secondary analysis was to examine the outcome of each study abroad factor for both the hard and soft discipline categories. The study assumed study abroad factors had links with dimensions of global engagement in research even in specific discipline categories. In response, the analysis split data so as to model each discipline category separately across all the research dimensions. Like all previous analyses, negative binomial in GEE was executed through the xtgee command in STATA 14 and results reported below according to by disciplinary category within each dimension of research engagement.

#### **7.5. Results of the GEE analysis**

Results indicate hard disciplines require greater depth, studying in more developed countries and longer durations abroad for some dimensions (Table 7.2). Greater depth in the hard disciplines, would correlate with 1.42 collaborations and 1.40 conferences more respectively per year. It would also have adverse results in international publications and affiliations in the hard disciplines. Again in the hard disciplines, faculty who had longer durations abroad would on average correspond to 2.44 international affiliations. Meanwhile, studying in more developed countries would correlate with an increase of 1.65 in international collaboration for faculty in the soft disciplines. It is clear; depth, duration and destination are critical factors in global research engagement outcomes but for only some of the discipline models and research dimensions. Covariates had significant associations with outcomes

across the disciplines for various dimensions of research engagement. To further assess details, results are presented according to the dimensions of international research participation.

### ***International collaborations***

Studying abroad for a doctorate had an impact on collaboration across disciplines. In the hard disciplines, collaboration was positively associated with greater depth in the hard disciplines. For instance, faculty who experienced more intense experiences during the study abroad experience would on average have more international collaborations than faculty with lesser depth. Depth is a wider experience that involves even internship abroad and the present outcome could reflect on the potential role of previous partnerships during internships common in the hard disciplines. Gender also affected engagements in the hard disciplines. Male faculty compared to females would also have an increase international collaboration rates. Meanwhile, international publications, projects, conferences and funding covariates all suggested positive collaboration outcomes for faculty in the hard disciplines. However, duration, destination, age, experience, education level and academic rank had no significant association with collaboration in the hard disciplines. Also, international affiliation and conferences as a covariates had no significant relationship with collaboration. In the hard disciplines, therefore, key factors affecting collaboration are depth and gender.

For the soft disciplines, it was only destination that correlated with international collaboration dimension. Faculty who studied in more developed destinations

would also be expected to have more international collaborations within the soft disciplines. Studying in more developed destinations would be more rewarding for faculty than studying in less developed countries. Depth and duration in the same disciplines had no association with international collaboration. However, the demographic factors involving experience and gender were correlated with international collaboration. Destination was related to increased average international collaboration. Additional years of experience negatively affected engagement rates and male faculty compared to females had lower rates of international collaboration. Among other covariates, international publications correlated with increased rates in collaboration. Academics who publish more also collaborate more than their counterparts within the soft disciplines. In addition to age, other dimensions of research; international projects, conferences, funding and affiliations had no significant association with international collaborations rates in the soft disciplines. Although the outcome could be affected by the sample size, the objective outcomes were positive. According to results, therefore, international collaboration in the soft disciplines was associated with the destination, demographics and the amount of international publications by faculty.

### ***International publications***

Results for the hard disciplines suggest that changes in international publications correlated with changes in depth. Outcomes on international publications were different for each study abroad factor. Depth had adverse correlations with international publications. Duration and destination had no significant association



with the outcomes. Contrary to the expectation, faculty who had a more intense experience abroad in terms of depth were linked to a decline by a factor 0.61 lower in international publications per year. The demographic factors had mixed outcomes. Academics with a postdoc compared to those without a postdoc would have increased rates for international publications. Age, gender, experience, and academic rank had no significant association with publications in the hard disciplines. Covariates of study abroad outcomes, especially projects, funding and collaborations had a positive association with international publication in the soft discipline, but international affiliation had no link with international publication. Given adjustments for covariates, depth, duration and a postdoc experience would correlate with international publication rates in the hard disciplines.

In the soft disciplines, the outcomes nullify the expectation that study abroad factors correlated with international publications. Depth, duration, and destination had no significant association with international publications. On the contrary, faculty demographics correlated with international publications. Age correlated with the changes in international publication rates. Age was associated with a decline in publication rates in the hard disciplines. The implication would be that faculty who still young would publish more than faculty who were older. Unlike their counterparts in the hard disciplines, postdocs in the soft disciplines surprisingly had lower outcomes in publications. The study also found strong correlations between other research dimensions and international publication rates. Collaborations, affiliations, and collaborations were found positively linked to publications. The more faculty were engaged in activities of correlated research

dimensions, the more they were likely to have international publications. There were no significant outcomes for international publications associated with experience, international funding and participation in international projects. Therefore, while study abroad factors in the baseline analysis found no link between specific study abroad factors and international publications, the changes in depth would correlate with international publications in the hard disciplines. For the soft disciplines, demographic factors more than any study abroad factors had correlations with academic performance in international publications.

### ***International projects***

Under the international projects dimension, destination and demographic correlated with outcomes. For the hard disciplines; destination, depth, and duration would have no significant association with participation in international projects. However, changes in outcomes would be correspond to changes in some demographics. Academic rank and education level had no significant relationship with international projects. Meanwhile, among covariates, only affiliations would correlate with projects. An increase in international affiliation would correspond to increased faculty access to international projects. International publications, collaborations, conferences and funding had no association with international projects. Therefore no information on international projects of the faculty may be gained by the awareness of other research engagements for faculty in the hard disciplines. Similarly age and gender had no correlation with international projects.

In the soft disciplines, participation in international projects associated with academic rank. Among the covariates; international conferences and funding positively associated with increased participation in international projects. Academic rank, international affiliation and collaboration suggested no association with outcomes for international projects. Furthermore, age experience, gender, and education level had no significant association with projects and therefore changes in such variables would mean nothing to the outcomes. Given that projects are only linked with destination factor (in the hard disciplines only), it might be suggested that study abroad factors have no direct links with global engagement in international projects dimension.

### ***International affiliations***

Results under the international affiliation dimension suggested; depth and duration, would relate with international affiliations in a specific discipline category. Depth and duration would correspond with outcomes in the hard disciplines, but destination had no relationship with the result. Duration correlated with an increase of 2.44 international affiliations per year, but depth would correspond to a decline by a factor 0.53 times lower in international affiliations. By implication, academics with longer durations studying abroad would have more international affiliations within the hard disciplines.

Among the demographic variables experience had a positive correlation with international affiliation rates. Age, academic rank and education level had no links with affiliation rates within the hard disciplines. The dimensions of research

engagement had positive correlations with outcomes in affiliations. International projects and conferences would positively correspond with international affiliations in the hard disciplines. For instance, faculty who gained additional projects and had more presentations at international conferences were also likely to have more international affiliations. International publications, funding, and collaborations had no significant relationship with international affiliations within the hard disciplines. Therefore, for international affiliations in the hard disciplines, duration, depth, and demographics would explain changes in international affiliation rates.

In the soft disciplines, no study abroad factor was significantly associated with international affiliations. Depth, duration and destination, all had no significant associations with international affiliations. Within the demographics, additional years of age above average would correspond to lower rates of international affiliation for faculty per year. However, experience had a positive outcome on international affiliations. Therefore, faculty with more years of experience would have more international affiliations. Depth, duration, and other demographic factors had no significant association with international affiliations in the soft disciplines.

Still, in the soft disciplines, other research dimensions were correlated with international affiliations. International publications and conferences had positive and significant correlations with international affiliations. As expected, the more the international publications or conferences, the more the international affiliations. In the soft disciplines, faculty who had more publications and had more conference

presentations would also be expected to have corresponding increasing numbers of affiliations. Levels of International projects, funding, and collaboration, had no significance in international affiliations outcomes within the soft disciplines. In the final assessment on affiliation, therefore, study abroad factors affect affiliations but with mixed outcomes. For hard disciplines depth, duration and demographics factors affected outcomes. For the soft disciplines, demographics factors more than study abroad factors had linkage with international affiliation rates. Demographic factors; age and experience together with other research dimensions were among the factors associated with changes in outcomes in international affiliation.

### ***International funding***

In the international funding dimension, study abroad factors had no correlation with the results. Results on international funding in the hard disciplines suggest destination, depth, and duration had no correspondence with international funding. Instead the outcomes had links with some of the demographic factors. Faculty experience, age, and academic rank correspond with international funding. For faculty of average age, additional years would have a decline in access to international funding. On the other hand, additional years of experience following a doctorate would lead to an increase in access to international funding. Lecturers in the hard disciplines had lower access to international funding compared to the professors. For the research dimensions, increased activity in some of the dimensions correlated with international funding. International publications,

conferences and affiliations positively correlated with international funding rates. For instance, additional international conferences or additional international affiliations would correspond to additional access to international funding. International collaborations and projects had no significant association with funding rates in the hard disciplines. Therefore, the outcomes would be largely associated with demographics and activities in other research dimensions within the hard disciplines.

Within the soft disciplines, study abroad factors did not have a significant correlation with international funding rates. Depth, duration and destination factors had no significant relationship with international funding rates. Age, experience gender, education level and academic rank had no correlation with access to international funding in the soft disciplines. Instead, international projects and international collaborations were positively correlated with international funding rates. Faculty with more activity in international projects and international collaborations were likely to have more access international funding. On the other hand, increased activity in international publications, conferences and affiliations had no association with international funding. Corresponding in the hard disciplines, study abroad factors in the soft disciplines had no association with international funding.

### ***International conferences***

Like the funding dimension, the conference dimension had no correlation with any of the study abroad factors. Depth, duration and destination had some positive

outcomes in both hard and soft disciplines but none was significant. In the control variables, faculty with a postdoc experience compared to those without such experience would have more presentations at international conferences within hard disciplines only. Increased international conference presentations positively associated with increased activity in other research dimensions. Faculty with additional activities in other dimensions involving international projects, funding and affiliations had a corresponding increase in international conference activity other factors constant. However, additional years of experience would negatively correspond to outcomes of international conferences.

Study abroad factors had limited relationship with outcomes of international conferences in the hard disciplines. Some of the demographics correlated with conference presentations. Results suggest demographic factors involving age, experience and education correlated with the outcomes. Additional years above average of 49, would be related to additional participation in international conferences. On the other hand, as faculty gains more experience, the rate of attending international conferences declines. Besides, faculty with a postdoc experience would have more activity in international conferences. Among the research dimensions, increased activity in international projects, access more funding and gain more affiliations would also have corresponding increments conference presentations. However, international publications and collaboration had no significant relationship with international conferences. Considering the outcomes, covariates highly correlated with outcomes of international conferences both in the hard disciplines. Therefore, depth, duration, and destination had no

association with conferences rates in the soft disciplines but could only be explained by covariates.

### ***Conclusions***

In summarizing this section on the impact of global engagement across disciplines, all study abroad factors had some correspondence with some of the research dimensions, and outcomes vary by discipline and according to a specific dimension. Overall, results revealed greater association with the hard disciplines than in the soft disciplines. In the hard disciplines, depth affected international collaborations, publications, and affiliations. Duration corresponds with changes in international affiliation in the hard disciplines and destination was associated with collaboration in the soft disciplines, destination had impact only collaborations and affiliations. Demographics especially; age, gender, academic rank, education level, and experience, however, had a more distributed impact across disciplinary categories. The study examined impact within the context of other correlated dimensions of internationalisation of research that were in most case positively associated with the outcomes and therefore the importance of statistical control. The control was useful in determining the outcomes for specific dimensions.



Table 7.2: GEE table of impact of study Abroad factors across disciplines (N=795)

Variables	Collaborations		Publications		Projects		Affiliations		Funding		Conferences	
	Hard	Soft	Hard	Soft	Hard	Soft	Hard	Soft	Hard	Soft	Hard	Soft
Discipline*												
Depth	1.420* (0.203)	0.999 (0.234)	0.613*** (0.084)	1.037 (0.120)	1.225 (0.430)	1.020 (0.361)	0.530** (0.125)	0.864 (0.230)	0.677 (0.209)	1.252 (0.457)	1.397 (0.295)	1.048 (0.234)
Duration	0.892 (0.174)	0.694 (0.227)	1.293 (0.213)	1.009 (0.118)	0.827 (0.481)	1.446 (0.466)	2.439*** (0.520)	1.278 (0.399)	1.311 (0.434)	1.069 (0.303)	0.767 (0.233)	1.348 (0.290)
Destination	1.077 (0.176)	1.649* (0.393)	1.203 (0.153)	0.954 (0.094)	0.638 (0.180)	0.657 (0.155)	0.768 (0.160)	0.874 (0.189)	1.396 (0.327)	1.019 (0.312)	1.072 (0.207)	0.715 (0.124)
Age	0.699 (0.136)	1.965 (0.721)	1.153 (0.146)	0.636*** (0.066)	0.419 (0.219)	1.290 (0.274)	0.761 (0.126)	0.674* (0.129)	0.461** (0.110)	0.654 (0.257)	1.217 (0.256)	1.732** (0.332)
Experience	0.963 (0.036)	0.891* (0.047)	0.965 (0.018)	1.028 (0.016)	1.061 (0.059)	0.957 (0.030)	1.087** (0.028)	1.088** (0.033)	1.090 (0.052)	0.961 (0.053)	0.917** (0.028)	0.854*** (0.035)
Gender (male)*	1.987* (0.584)	0.447 (0.211)	1.267 (0.303)	0.876 (0.134)	4.063 (3.456)	1.846 (0.941)	0.475* (0.172)	1.056 (0.378)	1.704 (0.831)	0.540 (0.264)	0.997 (0.392)	0.646 (0.210)
Academic rank*	0.998 (0.093)	1.081 (0.274)	1.019 (0.073)	0.949 (0.064)	0.915 (0.206)	0.685 (0.162)	1.077 (0.136)	0.956 (0.160)	0.671* (0.118)	0.924 (0.208)	1.002 (0.136)	0.916 (0.105)
Education (postdoc)*	0.954 (0.225)	1.039 (0.928)	1.634* (0.330)	0.425** (0.136)	0.765 (0.528)	2.032 (1.247)	1.148 (0.342)	1.133 (0.721)	1.298 (0.664)	2.481 (1.429)	2.303* (0.752)	2.290* (0.816)
Publications	1.344*** (0.043)	1.408*** (0.057)			1.127 (0.098)	1.002 (0.078)	1.002 (0.035)	1.133*** (0.032)	1.095* (0.047)	0.983 (0.066)	0.992 (0.067)	1.143*** (0.039)
Projects	1.123* (0.062)	1.374 (0.508)	1.149*** (0.048)	1.099 (0.157)			1.144*** (0.036)	0.917 (0.150)	1.073 (0.094)	2.219*** (0.370)	1.110 (0.066)	1.938*** (0.212)
Conferences	1.056 (0.038)	1.088 (0.091)	0.944 (0.036)	1.119** (0.045)	0.943 (0.053)	1.221*** (0.059)	1.107*** (0.033)	1.184*** (0.053)	1.083 (0.050)	1.051 (0.057)		
Funding	1.172** (0.059)	1.210 (0.249)	1.194** (0.072)	1.055 (0.082)	1.226 (0.172)	1.802*** (0.179)	1.097 (0.074)	1.103 (0.137)			1.288** (0.108)	1.238* (0.118)
Affiliations	1.025 (0.069)	1.100 (0.106)	0.961 (0.039)	1.123*** (0.027)	1.418*** (0.127)	1.043 (0.068)			1.150 (0.084)	1.099 (0.082)	1.219** (0.077)	1.247*** (0.046)
Collaborations			1.307*** (0.041)	1.570*** (0.133)	1.026 (0.099)	1.269 (0.244)	1.070 (0.057)	1.031 (0.106)	0.999 (0.066)	1.309* (0.179)	1.099 (0.078)	1.040 (0.114)

Notes: Exponentiated coefficients; Standard Error in parentheses. Significance values starred = \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

a = Discipline represents academic disciplines categorized into hard and soft disciplines.

b = Gender is a categorical variable with female as the reference category.

c = Academic rank with four categories is treated as a continuous variable.

d = Education variable is a categorical variable with Ph.D. as the reference category.

### **7.6. Study abroad factors and global engagement across gender categories**

The aim the current secondary analysis was to determine the categories of the outcome across gender. The study had an assumption that the outcomes would be the same for male and female faculty. The analysis was done by splitting data into male and female categories and fitting a negative binomial using the GEE method. Results for the analysis were examined and presented below.

### **7.7. Results of the GEE analysis**

Following analysis of each gender category, study abroad factors were associated with outcomes especially in international affiliations and funding dimensions. (Table 7.3). Results reveal that duration for males was positively correlated with access to international funding. Male faculty who spent more years abroad would have 1.50 times more access to international funding per year than those who spent fewer years. On the other hand, female faculty would have lesser affiliation rate following high intensity study experiences abroad. Female faculty who had greater and by implication, more intense experiences would have corresponding low rates of international affiliations and funding per year. Therefore, females were prone to having adverse effects when subjected to more intense experiences abroad. For the current analysis, the details of outcomes are presented according to dimensions of research engagement and by gender.

#### ***International collaborations***

Study abroad factors had no significant correlation with international collaborations. Depth, destination and duration factors, all had no relationship with collaboration. Moreover, age, experience, academic rank, and education level also had no association with international collaboration for the female faculty. International collaborations and conferences positively correlated with changes international publications for female faculty. Other covariates; international projects, publications, affiliations, funding and conferences also had no association with international collaborations. The outcomes in the international collaboration dimension indicated no links with any of the study variables for the model.

The results for the male faculty had no big difference with outcomes for females under international collaboration dimension. Depth, duration and destination had no significant correlation with international collaboration. Similar to the female faculty, age, academic rank, and education level had no significant association with changes in collaboration rates. However, International collaboration had positive correlations with other dimensions of research engagement. For male faculty, international publications, projects, and funding positively correlated with international collaboration. International affiliations and conferences as covariates had no correlation with international collaboration. The outcomes in the current dimension further illustrates dimensions less affected by study abroad factors.

### ***International publications***

No association was found between study abroad factors and the international publication dimension across gender categories. In the female faculty model, no

association was found with depth, duration or even the demographics factors. Although other dimensions of research engagement had corresponding increments for international publications, only collaborations had significant correlations with publications. The increase in international collaborations for female faculty would have corresponding increments in international publications. For the female faculty, access to international projects, funding conferences and affiliations would have no implications on their levels of international publications. Therefore outcomes would only be predicted by performance in other research dimensions and not study abroad factors or demographics.

Among male faculty, no association was found between study abroad factors and engagements in international publications. Demographics factors including; age, academic rank, experience and education level had no association with international publication within the male faculty. Among the research dimensions, however, affiliations and collaborations were positively correlated with international publications. International conferences, projects and international funding had no correlation with publications. The international publication rates for female faculty correlated with funding; male publication rates had no association with funding. Again, whereas male publication correlation with affiliation, female publications had no association with affiliation. International publications dimension is another aspect of engagement with little association with specific study abroad factors.

### ***International projects***

The international project dimension was equally unrelated to specific study abroad factors. When split, depth, duration, and even destination had no association with international projects. Within the female faculty model age among the demographic factors had a relationship with results in international projects. Age for female faculty was positively related to international projects. As female faculty age beyond average, the rate of participation in international projects also tends to increase. However, as experience grows, the rates of participation in international projects for female faculty would decrease. Perhaps the implication for the impact of experience could be that many years of experience could mean a more advanced age and with implications of low productivity on account of age. Correspondingly, an increase in international funding rates for female faculty would positively correspond to increased rates of access to international projects compared to male faculty. More international collaborations, funding, affiliations, and publications had no significant association with outcomes in international projects for the model.

Even among male faculty, participation in international projects had no correlation with any specific study abroad factors. Age, experience, academic rank, and a postdoc experience would also have no relationship with outcomes. Other research dimensions positively associated with male participation in international projects. Access to international funding, and affiliation had a significant association with international projects and implying that increase in any of them would correspond to positive outcomes in the project dimension. Changes in international publications, collaboration, and conferences had no relationship with

outcomes in the project dimension for male faculty. Differences in international projects for males and females could, therefore, be attributed to study abroad destination and age but not depth and duration. Other factors could be faculty experience, access to funding and collaboration rates. International projects is one more dimension with no significant relationship with any specific study abroad factors.

### ***International affiliations***

In the affiliation dimension, depth had an impact on female faculty, but destination and duration had no association with international affiliations for the female faculty. For female faculty, depth would correspond to a significant decline in international affiliations. The outcome is a surprise and could pose adverse consequences to practice. The outcome means that female faculty who had more intense study experiences would have low rates of international affiliations per year.

Among the demographic factors, only academic rank was a significant predictor of international affiliations. Other factors, such as age, experience, academic rank and education level had no correlation with outcomes for international affiliations. No significant outcomes were found with dimensions of research engagement though most of them predicted positive correlations. The negative result needs in the about the relationship between depth and international affiliations need to be treated with caution because of the small number of female faculty in the sample and the outcome could turn out to be an artefact of the sample.

Male faculty, unlike female faculty, had no connections with depth. Instead, they were affected by duration, destination, and the demographics. Duration predicted positive outcomes but destination correlated with a decline in affiliations. For instance, longer durations of study abroad would have positive outcomes of more international affiliations for male faculty. On the other hand, faculty who studied in more developed destinations would have a lower rate of international affiliations.

Among demographic factors, an increase in faculty age would correspond to declining rates of international affiliations, while experience would correspond to increasing affiliations rates. The apparent contradictions between outcomes of age and experience imply that increased outcomes as a result of experience might only be possible for younger faculty. Among the dimensions of research engagement, international publications, projects, and conferences positively correlated with international affiliations. No significant correlation was found with international funding and collaboration. Therefore, male faculty with increased activities in relevant dimensions of research would, be expected to have increased rates of international affiliations.

### ***International funding***

The international funding dimension would be affected by duration in the model for male faculty model and depth in the female faculty model. The rate of access to international funding for female faculty had an adverse effect linked to with depth of the study experience. The more intense the study experience, the lower the rates of access to international financing, other factors constant. Demographics

also had negative relationships with international funding outcomes for female faculty. For instance; compared to Associate Professors faculty at the level of lecturer would have lower international funding rates, other factors constant. Unlike male faculty, female faculty with a postdoc would have a corresponding increase in international funding rates. Some of the covariates were correlated to increase in funding rates. International projects, conferences, and collaboration, were associated with increased funding rates. Affiliation to international bodies had significant and positive results but negative for international funding among females. Academic rank, access to international projects and affiliations had no significant relation to international funding. While female performance was linked associated with depth, male faculty performance in international funding was linked to duration.

Unlike the female faculty, access to international funding for the male faculty would correlate with duration but still no significant relations with depth and destination. Faculty with longer years of study abroad would have increased rates of access to international funding. Results suggest a standard deviation increase in duration abroad would correlate with an increase in access rates per year for funding in the male category. Results also showed that projects, conferences, publications and collaborations would positively correlate with funding for male faculty. However, international publications, affiliations, and collaborations had no significant association with international funding outcomes. Academic rank, education level, and experience were also not associated with funding rates for male faculty.



Therefore, while females were affected by depth and academic rank, males were affected by duration.

### ***International conferences***

No specific study abroad factors correlated with outcomes of international conferences. Presentations at international conferences were predicted by the level of activity in other research dimensions. The study examined female and male models separately and the result was a surprise. Among covariates under the female category, only international publications and funding had no relationship with international conferences. As activity increases on international projects, affiliations, and collaborations, participation rates at international conferences would be expected to increase. For female faculty, therefore, international affiliations would positively be correlated with international conference presentations per year. International projects and collaboration had no significant association with the number of conference presentations. Similarly age and experience were no significant predictors of international conference outcomes,

Like in the female category, male faculty were not affected by depth, duration, and destination but were affected by age and experience. Age predicted an increase in conference rates, the experience would correlate with a decrease in rates. The results suggest additional years for average age faculty, would enhance their participation in international conferences. This outcome appears to have a limited scope of time even for young faculty. As faculty gain more years of experience, international conferences rates also reduce.

Faculty years of experience following the Ph.D. also affect rates of engagement. For instance; while academic ranking had no implications for males, education level would affect conferences for male faculty. Results indicated that compared faculty with Ph.D., postdocs improved on their rates of global engagements and thereby pointing to an advantage of attaining a postdoc experience. Some covariates associated with dimensions of research engagement correlated with conference outcomes. Unlike the female faculty, male engagements in conferences correlated with all the covariates. Publications, affiliations, projects, funding and collaboration rates were all positive and significantly correlated with conferences. Additional activity in any of the research dimensions would correspond to increase in international conference presentations for the male faculty. It is there more beneficial for faculty to be active in across all dimensions of engagement with the likelihood that overall engagements would potential increase. While outcomes for international conferences were explainable by changes in demographics and other research dimensions, there is no suggestion that study abroad factors had any influence.

### ***Conclusions***

In summary, the study outcomes suggest study abroad factors would predict outcomes in some of the research dimensions. Outcomes of specific study abroad factors would sometimes vary by discipline and gender depending on the specific research dimension. Depth correlated positively with outcomes for international

affiliations and funding dimensions among female faculty . Duration mainly affected affiliations and destination was associated with publications.

Among demographic factors, age was positively affected projects and conferences and negatively on collaboration for female faculty. For male faculty, depth would not affect international research engagements. Duration would affect affiliations and funding. Study abroad destination would affect international collaboration, projects, and affiliation. Other factors in higher education research would also account for variation in outcomes following the Ph.D. experience. Academic rank, years after Ph.D., and postdoc experience would also affect international research engagements for each gender category and research dimension. Dimensions of international research engagement were in most cases correlated. Changes in one dimension would correspond to changes in the other dimensions and therefore with potential implications for international research engagements.

Table 7.3: GEE table for impact of study abroad factors across gender (N=795).

Variable	Collaborations		Publications		Projects		Affiliations		Funding		Conferences	
	Female	male	female	male	female	male	female	male	female	Male	female	male
Gender <sup>a</sup>												
Depth	0.981 (0.474)	1.322 (0.308)	1.157 (0.537)	0.805 (0.143)	3.380 (3.139)	0.826 (0.326)	0.375** (0.129)	0.920 (0.183)	0.297** (0.135)	0.822 (0.237)	1.639 (0.778)	1.230 (0.192)
Duration	0.555 (0.450)	0.900 (0.165)	0.670 (0.247)	1.125 (0.171)	0.319 (0.432)	1.260 (0.450)	1.760 (0.663)	1.510 (0.370)	2.393 (1.649)	1.499* (0.297)	0.509 (0.349)	1.111 (0.202)
Destination	1.383 (0.811)	1.299 (0.215)	1.502 (0.415)	1.026 (0.115)	1.759 (1.910)	0.654 (0.150)	1.184 (0.452)	0.762 (0.126)	1.707 (0.774)	1.186 (0.308)	1.329 (0.601)	0.857 (0.118)
Age	0.486 (0.202)	1.034 (0.285)	0.851 (0.361)	0.827 (0.140)	6.107** (4.163)	0.522 (0.196)	1.080 (0.295)	0.613** (0.0975)	0.825 (0.575)	0.517* (0.136)	1.664 (0.570)	1.482** (0.222)
Experience	0.994 (0.074)	0.940 (0.035)	1.019 (0.067)	0.985 (0.026)	0.778* (0.082)	1.070 (0.055)	1.027 (0.037)	1.106*** (0.025)	0.961 (0.095)	1.062 (0.046)	0.890 (0.056)	0.877*** (0.023)
Academic Rank <sup>b</sup>	1.339 (0.329)	1.002 (0.117)	0.900 (0.162)	0.950 (0.083)	1.609 (0.912)	0.914 (0.180)	0.686 (0.164)	1.020 (0.139)	0.176** (0.099)	0.876 (0.149)	0.828 (0.202)	0.927 (0.108)
Postdoc <sup>c</sup>	1.716 (0.898)	1.483 (0.410)	0.721 (0.281)	1.078 (0.304)	2.953 (2.686)	0.760 (0.464)	0.651 (0.480)	1.438 (0.491)	3.819 (3.117)	1.578 (0.632)	1.404 (0.818)	2.603*** (0.754)
Publications	1.341*** (0.093)	1.371*** (0.034)			0.980 (0.071)	1.058 (0.063)	1.057 (0.050)	1.132*** (0.028)	0.951 (0.046)	1.033 (0.037)	1.012 (0.054)	1.087* (0.039)
Projects	0.421 (0.204)	1.268*** (0.080)	1.286 (0.329)	1.069 (0.046)			1.513 (0.342)	1.092* (0.040)	2.912* (1.415)	1.196* (0.094)	1.419 (0.279)	1.196** (0.071)
Conferences	1.160 (0.094)	1.060 (0.041)	1.052 (0.049)	1.016 (0.033)	1.106 (0.109)	1.033 (0.059)	1.093 (0.050)	1.158*** (0.047)	1.039 (0.113)	1.126* (0.061)		
Funding	1.162 (0.129)	1.256*** (0.076)	1.147 (0.103)	1.045 (0.069)	2.517** (0.873)	1.360** (0.157)	0.786 (0.131)	1.120 (0.075)			1.008 (0.155)	1.347*** (0.097)
Affiliations	1.100 (0.086)	0.964 (0.050)	1.085 (0.066)	1.126** (0.044)	1.401 (0.341)	1.170** (0.064)			0.874 (0.073)	1.094 (0.064)	1.190* (0.093)	1.217*** (0.036)
Collaborations			1.852*** (0.223)	1.262*** (0.049)	0.415 (0.202)	1.148 (0.089)	1.163 (0.195)	0.939 (0.042)	1.463 (0.426)	1.044 (0.067)	1.535 (0.358)	1.035 (0.045)

Notes: Exponentiated coefficients; Standard Error in parentheses; Significance values starred = \* p<0.05, \*\* p<0.01, \*\*\* p<0.001  
a = Gender is the grouping variable for outcomes in each dimension.  
b = Academic rank has two categories; Lecturers and Professors, with the latter being the reference category.  
c = Postdoc is one category of the binary categorical variable; education level and with a Ph.D. being the reference category.

## 7.8. Chapter Summary

The current chapter aimed at determining the extent to which specific study abroad factors are linked to specific dimensions of global engagement in research for HE faculty across the six research dimensions. The assumption was that study abroad factors would have a significant association with each dimension of global engagement in research and that even across categories of academic discipline and gender, the outcomes would be the same. The study involved numerical data extraction for the study abroad factors and dimensions of global research engagement using a CV analysis method. Following the baseline analysis, the secondary analyses examined whether outcomes were the same across academic disciplines, and across gender categories. The subsequent sections summarize the results of the analyses.

In the baseline analysis, the study abroad destination emerged to be the only significant predictor of global engagement and this was noted in research for the international collaboration model. Duration, and depth, each in isolation had no association with global engagement. Some demographic factors had relationships with study abroad and could explain some of the variation in outcomes. In particular, age, experience, academic ranks, education level, and gender could partly explain changes in outcomes in some respects.

In the split analysis by discipline category, study abroad factors correlated with some of the specific outcomes of particular disciplinary category and research

dimension. Study abroad factors affected the hard disciplines more than the soft disciplines. Depth predicted international collaborations, publications, affiliations and conferences, for the hard disciplines. Similarly, duration was related to affiliations, and destination correlated with collaboration in the soft disciplines. Meanwhile, the impact of demographics was more distributed across disciplinary categories and dimensions.

Within the split gender categories, the analysis revealed differences on each dimension of international research. For female faculty, depth significantly predicted international affiliations and funding dimensions, duration factor predicted affiliations for males only and destination had no significant association with any of the outcomes in all the dimensions for both male and female categories. Funding which had remained unaffected by depth became significant under the female faculty model. The result implies that differences would occur given the gender category. Student destination which had an impact in the prior analysis before splitting data had no significant result following the data split. The implication would be no differences in outcomes arising due to gender differences. For destination, therefore, the outcome suggested no difference in outcomes no matter the gender. However, duration outcomes implied the possibility of differences in outcomes arising from the impact of duration on each category. Noted in the results was that demographics, particularly age would positively affect projects and conferences and negatively on collaboration for female faculty. For male faculty, depth would not affect international research across all dimensions. Duration would affect affiliations and funding. The study destination would have an

effect on collaboration, projects, and affiliation. Other factors in higher education research would also account for variation in outcomes following the Ph.D. experience. Academic rank, years after Ph.D., and postdoc experience would also affect international research engagements for each gender category and research dimension.

To a greater extent, the correlations among the six dimensions of international research engagements largely explain outcomes in international research participation. Even across disciplines and gender categories, international research dimensions positively correlated among themselves for most of the analysis. Changes in one dimension would correspond to changes in the other dimensions and therefore with potential implications for international research engagements in general. It raises the potential of the six categories; funding, conferences, projects, publications, collaboration, and affiliations are mutually reinforcing outcomes for one another.

## **7.9. Discussion**

The chapter aimed at assessing the extent to which specific study abroad factors affected outcomes in specific dimensions of global engagement in research. The assumption tested was that specific study abroad factors would each affect each dimension of global engagement in research. The results suggest that study abroad factors had mixed outcomes on the diverse dimensions of global engagement in research. The intensity of the study experience abroad had corresponding implications for future international conference participation.

Duration affected collaboration and affiliation in global engagement. Destination affected projects and funding in the hard disciplines but in the soft disciplines, it correlated with collaboration and affiliation. Meanwhile, demographics had mixed outcomes in the various dimensions of global engagement. In the subsequent paragraphs, specific predictor variables are discussed.

Depth as a factor of study abroad programs was found important in determining outcomes on global engagement in conferences. The outcome was tracked and found to be specific to the hard disciplines. Reflecting on the different aspects of depth; studying in English destinations, had an internship or research experience, studied in a common destination, studied abroad before Ph.D., studied abroad before Ph.D., and study in more than one destination were likely to have higher levels of global engagement in the conference dimension. Hard disciplines, according to Kyvik & Larsen (1994) often appeal to international audiences than the soft disciplines due to the level of standardisation. However, standardization does not sufficiently explain the global engagement. Paige et al. demonstrate that depth indeed positively affected; volunteering for social justice, civic engagement and global leadership. Similarly, Norris & Gillespie (2009) anticipated the same results when they found that a full year course, enrollment in hosting university, internship, and host family living arrangements positively correlated with later career life. Arguably, the outcome on the positive correlation between study abroad and global engagement in conference would be expected for faculty who have had an international experience.



More specifically, the impact was visible in the hard disciplines. International collaboration and conferences increased but affiliation and publication declined significantly. Even across gender, depth negatively affected funding and affiliation. The implication being that the deeper the experience, the lower the rates for international funding and affiliations. The exception to the result was in the international conference outcomes. Depth apparently yields positive results for some dimensions and negative on other dimensions. Over emphasis on depth without caution could lead to unexpected outcomes. Therefore, further study of the impact of depth is needed to clarify the impact of depth on on global engagement.

With respect to duration abroad, longer stays abroad only impacted on levels of international affiliation. Staying longer abroad has the implication of getting more affiliated in international societies than those who stay for shorter durations. The argument is even logically compelling because students who stay longer have time to learn more and become aware of international societies in their fields and have time to become members and engage with them. Such opportunities would be limited in shorter durations abroad. The positive influence of duration might appear to be contrary to the findings of Kyvik and Larsen. However, the positive outcome in the current study is associated with affiliations and not on publications. International affiliation and publications are highly correlated (Tables 7.1). It could mean that highly affiliated faculty would publish more. Submitting this claim to further scrutiny revealed that the correlation between affiliation and publications had support in the soft disciplines than the hard disciplines [Table 7.2]. The implication is that affiliation for those who studied abroad improves outcomes for

soft disciplines than the hard disciplines. The reason for this outcome is perhaps that the hard disciplines are by their nature international, and therefore the additional role that affiliations play in facilitating publications in international journals could be minimal compared to soft disciplines. It is, therefore, important for faculty in the soft disciplines than hard disciplines to seek professional affiliation during their study abroad to enhance prospects of increased publications in international journals.

The study destination, in particular, positively affected international projects and funding in the hard disciplines. The study destination had no correlation with other dimensions of research. The correlation with projects suggested that studying in countries with a higher HDI would correspond to having higher participation in global research projects. This finding is interesting because international funding and projects mainly come from countries with a high HDI and the participants are faculty with doctorates obtained from similar countries. Funding for research in Uganda largely comes from agencies from USA, UK, Sweden, Norway, and Germany. In line with Katz and Martin (1993), international collaboration plays a vital role in influencing access to international funding given the linkage between students and donor countries. However, international collaboration is not a significant predictor for projects or funding in the current analysis, instead, affiliation had a significant correlation with both projects and funding especially in the hard disciplines (Table 7.2). The outcome, therefore, suggests that although success in international projects and funding correlated with the study destination, international affiliation is equally a strong determinant. Data was not specific on

the background of societies, but the same countries are leading scientific centers. As study abroad graduates are more likely to be affiliated with societies in the same countries during their time of study abroad, they have better chances of getting tipped about opportunities through contacts in societies.

In the soft disciplines, destination correlated with international collaboration and affiliation. Graduates are more likely to be members of societies in the country where the doctorate was obtained. However, why would graduates from high HDI countries have a higher number of affiliations compared to students from lower HDI countries? The answer could lie in the centrality of the destination as a center of science. It lends credence to the arguments that the so-called global science is the science of the centers (Stolte-Heiskanen cited in Kyvik & Larsen 1994). Scholars in countries outside these centers would be expected to seek affiliations of societies based in global centers of learning. Countries high on HDI are also the global centers of science. Therefore, graduates from such countries would find it easy to register membership in such societies during the time of study compared to graduates who study in other nations outside global centers of science. This further highlights the importance of destination choice in study abroad but the identity of the affiliations would make this point conclusive.

Demographic factors have long suggested strong correlations with study abroad outcomes. Many studies have found demographic factors associated with productivity levels and are therefore bound to affect results for global engagement levels. The study revealed that demographic factors; age, gender, experience,

educational attainment and academic rank affected outcomes in various ways. Early research done by Kyvik (1990), showed that age affects publication activity in a curvilinear manner with peaks at 45-46 years of age and eventually declining at the age of 60 years. Kyvik further suggests that decline to vary according to discipline. Little variation existed in the social sciences. In the medical and natural sciences productivity was found to continue declining with increasing age. The differences in changes in productivity were explained in terms of differences in the rapid development of scientific knowledge in the different fields and perhaps sheds light on current study findings showing diverse outcomes by disciplinary category. A later study found demographic variables; age, rank, and gender, as some of the moderators in collaboration (Lee & Bozeman 2005). A more recent study by Rosterd & Arknes (2014) support findings on the specific influence of variables; age, gender and academic position on research performance. Their findings were that females publish less than males, and professors publish more than Associate Professors or post-doctorates and that physical age and academic age (experience) were found related to publication rates. Publication rates by physical age had a U-shape with the highest performance being between 40-50 years old. They concluded that productivity was a function of age, age squared, academic position and gender for all disciplinary fields investigated. It is therefore by no surprise that demographic factors were found to affect outcomes on global engagement in similar patterns.

Finally, the dimensions of research engagement as control variables were highly correlated. The implication is that faculty might make better progress on global

engagement in research by being active across all the dimensions irrespective of their study backgrounds. Foreign doctorates make an early start on internationalisation and would make better progress. Few studies considered correlations among the dimensions of research. Nevertheless, the positive correlations between collaboration and funding (Katz and Martin 1993; Melin and Persson 1996; Ubfala & Maffiolib 2011), publication and was long observed funding (Chudnovsky et al. 2008), collaboration and publications (Good 2005; Lee & Bozeman 2005). The current study has reinforced the earlier findings. The high correlations among the dimensions of global engagement, if not controlled, could distort estimates of other predictors. The implication for future studies on global engagement in research as well as academic productivity, in general, involves sensitivity to the role of other covariates during the analysis.

### **7.10. Conclusions**

The chapter which set out with the objective of assessing the extent to which the four factors of study abroad involving destination, depth, duration and demographics as predictors of global engagement in research for higher education faculty. The assumption that study abroad factors would correlate with dimensions of research engagement was examined. Study abroad factors had mixed outcomes in relation to dimensions of research engagements. Focusing on one factor would, therefore, imply less impact on some of the dimensions and would not guarantee expected outcomes. In the world today with a diversity of study abroad programs emphasizing on different factors of study abroad especially

depth, outcomes are likely to become increasingly less systematic. A more careful analysis is needed when considering a combination of factors and especially when making recommendations on approaches to studying abroad for global engagement.

## **Chapter 8 : Endurance of Global Research Engagement across Generations**

### **8.1. Introduction**

In chapter 8, numerical data from the LCVA method was used to examine progress on global engagements by faculty who received studied abroad for a doctorate. This chapter examines the extent to which the impact of a doctorate abroad on global engagement in research endures as a function of generational change after Ph.D. The study assessed the assumption that foreign doctorates across different generational cohorts of study abroad would be expected to have higher rates of global engagement in all the various forms of research engagement than domestic faculty. The assumption was tested across the six forms of research engagement and comparing the outcomes across three cohorts.

Summary statistics in the second section were produced to explore data to ascertain whether the cell counts are sufficient for the GEE method. Subsequently, the GEE method comparing research outcomes for domestic and foreign doctorates while adjusting for confounders, was conducted using the xtgee command in STATA 14. The study selected the negative binomial distribution family with a log link, the autoregressive structure, time as a clustering variable and with robust standard errors in the analysis. The last part of the Chapter contains the summary of results and followed by discussion and the concluding section.

## 8.2. Sample characteristics

In addressing the research question, the analysis involved the same dataset from the coded curriculum vitae. Before analysis, data was grouped according to cohorts of experience so that each cohort could be analyzed separately. Clusters involved; faculty with less than five years of experience named “Early Career” cohort, faculty between six and ten years grouped as the “Mid-career”, and faculty beyond ten years characterized as “Advanced Career” cohort. The cohorts constituted three empirically generated categories of experience manifested the potential durability of study abroad impact across experience.

In descriptive statistical analyses, summary statistics for both predictor and outcomes variables in each cohort determine group sizes and results. The summary statistics indicated that the Early-career generation had the lowest average age of 43 years; the mid-career average age was 47 years, and advanced career group had 56 years average. Foreign doctorates had the higher numbers than domestic graduates across all the three cohorts. In gender, the male faculty was more than female faculty across all the three cohorts. Across the three cohorts, Ph.D. graduates outnumber their counterparts who attained a postdoc experience, and the soft disciplines had more faculty in the sample than the hard disciplines.



Table 8.1: Cohort sub-sample observation frequencies across demographics.

Variable	Category	Early Career	Mid-career	Advanced	Total
PhD Award	Foreign	131 (18.58)	316 (44.82)	258 (36.60)	705
	Domestic	65 (30.77)	78 (37.50)	66 (31.73)	208
Gender	Male	133 (18.63)	317 (44.40)	264 (36.97)	714
	female	63 (30.58)	77 (37.38)	66 (32.04)	206
Education	PhD	163 (20.30)	358 (44.58)	282 (35.12)	803
	Postdoc	32 (29.09)	36 (32.73)	42 (38.18)	110
Discipline	Hard	92 (22.17)	192(46.27)	131 (31.57)	415
	Soft	103 (20.68)	202(40.56)	193 (38.76)	498
Total		196 (21.30)	394 (42.83)	330 (35.87)	920
Note	Percentages in parentheses.				

A cross tabulation was done with categorical data to ascertain the number of observations in each category before inferential statistics. As indicated already, Ph.D. award, gender, education level, and disciplinary category all had sufficiently large numbers of observations. However, when cross tabulated with career cohorts, academic rank had inadequate observations for analysis. The three generated cohorts of faculty were cross-tabulated with a binary category of academic rank composed of Professors and lecturers. The outcome was few observations in some of the cells. For instance, only 08 professors were in the Early Career group. The limited number of observations for the professors would make it difficult to get credible estimates. The subsequent GEE analysis, involved academic rank as a covariate of interest.

### 8.3. Descriptive Statistics

Outcome variables were also summarized by cohort and summary statistics examined. The results of the descriptive analysis revealed that foreign graduates had greater engagement in collaboration and funding dimensions. The foreign graduates maintained a lead across the three groups. In publications, the foreign doctorates had a lead in the early career and mid-career cohorts but fell below the domestic graduates in the advanced career cohort by a small margin. The same pattern was noted in the project dimension with foreign graduates getting higher averages in both the early and mid-career cohorts but declining the advanced career cohort.

Table 8.2: Summary of mean global engagement outcomes by cohort (N=795)

Career Cohort	Early Career (<6years)		Mid-Career (6-10 years)		Advanced Career (> 10)	
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign
PhD Award						
Publications	1.19 (2.07)	1.29 (2.14)	1.18 (1.83)	1.39 (2.27)	1.71 (3.38)	1.70 (3.47)
Collaborations	0.32 (0.83)	0.78 (1.57)	0.22 (0.72)	0.43 (1.18)	0.31 (0.84)	0.90 (3.25)
Conferences	0.86 (1.76)	0.82 (1.82)	0.67 (1.57)	0.94 (1.83)	0.45 (1.79)	0.65 (2.45)
Funding	0.30 (0.65)	0.73 (1.60)	0.11 (0.48)	0.51 (1.09)	0.18 (0.50)	0.45 (1.00)
Affiliations	1.18 (1.73)	1.17 (2.72)	1.79 (3.53)	1.67 (1.92)	1.95 (2.54)	2.60 (3.18)
Projects	0.25 (0.93)	0.30 (1.02)	0.12 (0.43)	0.30 (0.75)	0.97 (2.98)	0.36 (1.13)
Note	Standard deviations in parentheses.					

The descriptive statistics also revealed that foreign doctorates performed less than domestic graduates in both affiliations and conferences. In the early years and mid-career groups, foreign graduates had lower average engagements compared to the domestic graduates. The increase features most in the Advanced-career

cohort. Similarly, in the conference dimension, foreign doctorates in the early career cohort, had a lower engagement average compared to the domestic doctorates. However, the mid-career and advanced career cohorts performed better than the domestic graduates. In all the mean outcomes, the standard deviation was greater than the mean.

#### **8.4. GEE analysis procedure**

Following, the descriptive analyses, the GEE method was applied so as to observe outcomes, other variables controlled. The outcome variables consisted of the six dimensions of internationalisation of research and include international publications, projects, collaboration, conferences, funding, and affiliations. The independent variable was a dummy for domestic and foreign doctorates but labeled foreign. The analysis involved control variables in the analysis. Among them; age, gender, education level (Ph.D./Postdoc), and academic discipline. However, academic rank had low cell counts and was excluded. The GEE method is unaffected by the exclusion of academic rank because as a marginal model, it does not depend on random factors.

Each specific dimension of research engagement model was fitted while adjusting for confounding variables. Control variables included; demographic factors and any other remaining five dimensions of research engagement. Using international publications as an example of research specific forms of global engagement, the mean model for international publications for an individual faculty at a specific time period depends on parameters; degree award type, age of faculty, experience,

gender, and academic discipline. It will also depend on the number of international collaborations, funding, affiliations, projects and conferences as control variables. In addition, the mean depends on the, the constant, the exposure time and the error term. In solving for the mean value for the type of degree award, the marginal mean for international publications will be assumed equal to zero while other variables are controlled. Misspecification of the correlation structure would have no effect on outcomes as GEE is robust to such occurrence. For instance, in modelling outcomes for international publication, the GEE equation in chapter 4 of this thesis is applied across cohorts. Below is an example of the equation taken from international publications:

$$\begin{aligned}
 &g(\text{International publications}_{ij}) \\
 &= \beta_0 + \beta_1 \text{Award type}_{ij} + \beta_2 \text{Age}_{ij} + \beta_3 \text{experience}_{ij} + \beta_4 \text{Gender}_{ij} \\
 &+ \beta_5 \text{Academic discipline}_{ij} + \beta_7 \text{Education level}_{ij} \\
 &+ +\beta_8 \text{collaborations}_{ij} + \beta_9 \text{funding}_{ij} + \beta_{10} \text{Affiliations}_{ij} \\
 &+ \beta_{11} \text{Projects}_{ij} + \beta_{12} \text{Conferences}_{ij} + \text{Time} + \text{CORR} + \text{error}_{ij}
 \end{aligned}$$

The only difference with the analysis in question 6 of the thesis is that the data has been split by cohort, so that each cohort was examined separately for differences in the rates of global engagements for foreign and domestic doctorates. GEE coefficients for population average engagements, were converted into incident rate ratios and therefore global engagement are interpreted as the average rate of change per year.

### **8.5. Results of GEE Analysis**

The analysis aiming at examining endurance of outcomes of international research across cohorts of doctoral graduates found mixed outcomes among cohorts in each dimension of study abroad. It stands out that, foreign doctorates in the early years would have high rates of global engagement. Compared to domestic doctoral graduates, foreign-trained faculty had increased 5.21 times higher access to international funding compared to domestic doctorates. However, foreign study had adverse effects on international project and conference rates for faculty within the advanced career cohort. Results for the rest of the dimensions revealed positive outcomes for foreign doctorates but the differences were non-significant across cohorts especially in four dimensions including; publications, collaboration and affiliation rates. The subsequent sections consist of results of the analysis presented according to each dimension of research.

#### ***International publication***

The GEE compared publication rates for foreign and domestic doctoral graduates across the three cohorts; early career, mid-career, and advanced career all representing different clusters of years following return. When adjusting for other factors, results suggested no difference between foreign and domestic graduates irrespective of the amount of experience. Moreover, results further indicate that the substantive outcomes for foreign doctorates were lower across the three cohorts.

Early career faculty would have lower engagement rates compared to domestic faculty, but the outcome was not significant. Instead, age, international funding and collaboration were important factors associated with increased results in the early career years of the faculty. Age would be linked to an increase in rates (1.78 times higher) for publications. In the same way, international funding, and international collaborations would correspond to an increase in rates for international publications. However, faculty in the soft disciplines would have lower rates compared to faculty in the hard disciplines. Most of the predictor variables in the model were not statistically significant. Among them, academic discipline, international affiliations and funding had predictions for increased publication rates, but results were non-significant. Most of the demographic factors were not statistically significant. Gender, postdoc experience and being male were linked to lower rates in publications for the early career of the faculty. Therefore, increased outcomes on international publications in the early career correlated with variables; age, discipline, funding and collaboration and not the nature of the doctoral award.

Mid-career faculty results were consistent with the early careers especially on the impact of a doctorate abroad. Results predicted that foreign compared to domestic doctorates would have lower average rates in international publications, other factors constant. Contrary to having a foreign doctorate, results indicate that other dimensions of research engagement would correlate with publications. Faculty affiliations, conference presentations, collaboration, and discipline, were associated with increased international publication rates. International collaborations, and international conferences would be linked to an increase in

publications, other factors constant. Some predictor variables were not significant. International funding, international affiliations, international projects and being male were non-significant in the model although they correspond with substantive increments in international publications. On the other hand, demographics would correspond with negative outcomes. Age correlated with a decline in international publication rates, and the result was significant. Surprisingly, faculty with a postdoc experience would have lower rates of international publication outcomes.

For mid-career, faculty, therefore, publication outcomes remain consistent with the outcomes for the early career faculty. There was no significant difference between foreign and domestic doctorates in international publications. However, there was a lower rate in substantive outcomes for faculty in the mid-career cohort. Only demographics and associated research dimensions had significant associations with the results.

International publications in the advanced career, therefore, maintained the same pattern with early career and mid-career cohorts of no difference between foreign and domestic doctorates. The lack of difference between foreign and domestic doctorates appears to endure across the various cohorts of experience. Some of the individual characteristics had positive and significant outcomes while others were negative. However, the age for the Advanced-career faculty negatively affected international publication result, and the result was statistically significant. Besides, male faculty compared to female faculty would have lower publications

rates and faculty in the soft compared to hard disciplines would also have lower rates of publications respectively but both outcomes are non-significant. While most of the individual characteristics had negative outcomes, most dimensions of research engagement were positively correlated with international publications. Affiliation, and collaboration had a positive and significant association with international publication rates. The level of educational attainment, the levels of international funding, conferences presentations and access to projects correlated had no significant correlation with international publications.

Consistent with results in the early and mid-career cohorts, study abroad in the advanced career cohort did not affect rates of international publication, and the findings were consistent across cohorts. The lack of difference in publications between a foreign doctorate and a domestic doctorate endures across the different generation of faculty experience and moreover, any differences in engagement were negative for foreign doctorates.



Table 8.3: GEE table for publication rates across graduate cohorts (N=795)

Variables	International publications rates		
	Early Career	Mid-Career	Advanced Career
Cohort			
Foreign <sup>a</sup>	0.979 (0.361)	0.962 (0.255)	0.696 (0.287)
Age	1.775** (0.342)	0.708* (0.099)	0.378*** (0.073)
Gender (male) <sup>b</sup>	0.716 (0.177)	1.038 (0.267)	0.748 (0.343)
Education level (postdoc) <sup>c</sup>	0.807 (0.358)	0.764 (0.214)	1.710 (0.471)
Academic discipline (soft) <sup>d</sup>	0.667 (0.150)	1.638* (0.353)	0.886 (0.331)
Affiliations	1.031 (0.052)	1.046 (0.028)	1.160** (0.059)
Funding	1.272** (0.095)	1.024 (0.056)	1.123 (0.096)
Projects	1.095 (0.109)	1.064 (0.156)	1.018 (0.044)
Conferences	0.938 (0.091)	1.088* (0.045)	1.024 (0.014)
Collaborations	1.296** (0.123)	1.435*** (0.048)	1.162*** (0.021)

Notes: Exponentiated coefficients; Standard Error in parentheses.  
Significance values starred = \* p<0.05, \*\* p<0.01, \*\*\* p<0.001  
a = Foreign is a category for the type of award with a reference category being domestic.  
b = Gender is a binary categorical variable with female as the reference category.  
c = Education level is a binary categorical variable with a Ph.D. being the reference category.  
d = Discipline is a categorical variable with "hard discipline" being the reference category.

### ***International funding***

In the international funding dimension, study abroad appears to have long-term effects on faculty across varying years of experience. Faculty at an early career have the highest rates of international funding, but the impact seems to decline systematically as the analysis progressed into later cohorts (Table 8.4).

In the early career cohort, foreign doctorates compared to domestic doctorates had higher funding rates. Results indicate that foreign doctorates would have 5.21

times more international funding, other factors constant. Similarly, a postdoc experience and publications correspond with an increase in international funding rates. Many covariates also had positive correlations with funding rates, though results were non-significant. For instance, gender, international affiliation, projects, conferences, and collaboration would correspond to positive outcomes in international funding but the result had no statistical significance. Faculty in soft disciplines compared to those in hard disciplines would have an increase in rates but the difference would not be statistically significant. On the hand, demographics had some negative outcomes. The increased funding rates for early career faculty clearly revealed a strong link between study abroad and global engagement in higher education research but in the funding dimension.

The mid-career cohort results for foreign doctorates were equally greater than domestic graduates though the difference had no statistical significance. An increase in funding rates for foreign graduates was noted for foreign doctorates. Compared to domestic graduates, funding rates for foreign doctorates would significantly increase (3.70 times higher). Many covariates also correlated with international funding. For instance, international projects, publications, affiliations, and collaborations were positively be related to increased funding rates for mid-career academics and with the first two having significant outcomes. Meanwhile, other covariates had no significant association with funding. Age, postdoc experience, academic discipline and international conference presentations had no association with funding rates, and even the substantive outcomes were negative. The outcomes show a consistent decline. A foreign doctorate had a

significant lead in the early career cohort. Despite no significant result in the mid-career cohort, foreign doctorates had a substantive lead over the domestic doctorates, and the pattern is maintained even in the advanced career cohort.

For faculty under the advanced career cohort, results showed that foreign graduates got higher funding rates than domestic doctorates, but the difference in this cohort also had no statistical difference. Results also reveal that covariates at the mid-career stage of faculty experience had positive and significant outcomes for funding rates when other factors are constant. Gender and international affiliations significantly correlated with increased outcomes in international funding rates. Furthermore, a postdoc experience could correspond with an increase in funding rates, but the result was not statistically significant. On the other hand, some demographics and dimensions of research engagement correlated with low international funding rates. Age and faculty in the soft disciplines associated with lower average funding rates and with a significant outcome. Similarly, international publications, projects, conferences and collaborations had no significant relationship with international funding outcomes. Despite the difference being statistically non-significant, the substantive difference would indicate study abroad outcomes in the funding dimension persists even among faculty with more than ten years of experience. The results were consistent across the three cohorts of faculty hence suggesting that the outcome endures over time.

Table 8.4: GEE table for funding rates across graduate cohorts (N=795)

Variables	International funding rates		
	Early Career	Mid-Career	Advanced Career
Cohort			
Foreign <sup>a</sup>	5.214* (3.879)	3.078 (2.392)	1.984 (1.761)
Age	0.934 (0.294)	0.860 (0.280)	0.394*** (0.096)
Gender (male) <sup>b</sup>	0.404 (0.216)	0.897 (0.501)	7.141* (5.972)
Education level (postdoc) <sup>c</sup>	7.646** (5.690)	0.647 (0.295)	1.375 (0.783)
Academic discipline Category (soft) <sup>d</sup>	2.006 (1.024)	0.643 (0.275)	0.275** (0.127)
Publications	1.164** (0.054)	1.012 (0.056)	0.990 (0.057)
Affiliations	1.109 (0.103)	1.057 (0.111)	1.267** (0.094)
Projects	1.205 (0.173)	1.854*** (0.243)	0.928 (0.084)
Conferences	1.033 (0.084)	1.067 (0.042)	1.177 (0.113)
Collaborations	1.036 (0.099)	1.113 (0.136)	0.943 (0.095)

Notes: Exponentiated coefficients, Standard Error in parentheses.  
Significance values starred = \* p<0.05, \*\* p<0.01, \*\*\* p<0.001.  
a = Foreign is a category for the award with a reference category being domestic.  
b = Gender is a binary categorical variable with female as the reference category.  
c = Education level is a binary categorical variable with a Ph.D. being the reference category.  
d = Discipline is a categorical variable with "hard discipline" being the reference category.

### ***International collaborations***

The results of international collaboration showed mixed outcomes for foreign doctorates among the cohorts. While the early and advanced career cohorts had increased rates, the mid-career cohort showed lower average collaborations rates. Despite the substantive differences, one thing common among the three cohorts was the lack of significant difference between foreign and domestic doctorates on collaboration rates (Table 8.3).

Details of the collaboration model for the early career faculty suggest a positive outcome for foreign doctorates. Compared to domestic graduates, foreign doctorates would have 1.59 times more international collaboration but the difference would be non-significant. For the covariates, research dimensions were linked to increased international collaborations and with statistically significant results. Publications, projects, and conferences would correlate with increased rates for international collaborations. Levels of international affiliations and international funding had no relationship with international collaborations of the faculty. The International affiliation would be expected to correspond to increase in collaboration and funding was associated with a decline in collaboration rates, but results for both were not statistically significant. Among the individual characteristics, age and academic discipline, gender and a postdoc experience predicted no significant outcomes. Overall, a foreign doctorate made no difference in international collaboration for early career faculty.

Even in the mid-career cohort, the outcome was negative for the foreign doctoral graduates. Collaboration rates after 05 years of experience would be lower for the foreign compared to the domestic graduates. Foreign graduates would have lower rates of international collaborations, other factors constant. The reduction reflected negatively on the efficacy of study abroad for the mid-career faculty in collaboration. Some of the covariates on the hand positively correlated with international collaboration. Among the demographics, the age of faculty in mid-career would correspond with an increase (2.64 times higher) for international collaboration. Meanwhile, a postdoc experience would be expected to have a

corresponding increase in rates (2.87 times higher) for collaboration. Within the research engagement dimensions; publications, would correspond positively with increased rates for collaboration. International funding and international project dimensions were associated with positive outcomes for collaboration but were not significant. Among faculty individual characteristics, being in the soft disciplines compared to the hard disciplines would be linked to a possible decrease in collaboration. Surprisingly international affiliations and conferences had no significant correlation with international collaboration outcomes but was non-significant. The reduction in international collaboration for the Mid-career group is hard to explain because it could mean that domestic graduates dramatically improved or foreign doctorates performed less in their engagements. The decline of the impact of a foreign doctorate after a five year period could signal that the impact may not be that strong. The lack of statistical difference between domestic and foreign doctorates serves as further evidence that the relationship is weak.

The advanced career group results are consistent with results for the early career group. Compared to the domestic doctorates, the result shows foreign doctorates with an increase in rates 1.38 times higher for collaboration. Like in the in the early career and mid-career cohorts, the difference was not statistically significant. Demographic factors in an advanced career suggested negatively correlated with collaboration. A postdoc experience and being in the soft disciplines negatively affected collaboration but international publications positively correlated with collaboration. However, age, international conferences, affiliations and projects had no significant association with international collaboration. On the other hand,

Faculty at an advanced career, an increase in faculty collaborations would be associated with the number of international publication.

Overall, the results had mixed objective differences and non-significant outcomes. The results of a doctorate abroad seem to fluctuate but are consistent in being non-significant. Equally disturbing was the low collaboration rates associated with a postdoc experience for the advanced category. A postdoc experience would be expected to provide a boost to collaboration as seen in the case of the mid-career cohort. Collaboration rates appear to decline following years after the postdoc experience and could result from a possible loss of contact. This aspect, however, needs further study.

Table 8.5: GEE table for collaboration rates across graduate cohorts (N=795)

Variables	International Collaborations rates		
	Early Career	Mid-Career	Advanced Career
Faculty Cohort			
Foreign <sup>a</sup>	1.587 (0.932)	0.620 (0.342)	1.382 (0.528)
Age	0.638 (0.174)	2.641*** (0.626)	0.801 (0.145)
Gender (Male) <sup>b</sup>	1.257 (0.606)	1.219 (0.615)	1.057 (0.841)
Education level (Postdoc) <sup>c</sup>	0.951 (0.566)	2.870* (1.460)	0.312* (0.152)
Academic discipline (Soft) <sup>d</sup>	0.507 (0.214)	0.153*** (0.0731)	0.209** (0.115)
Publications	1.248** (0.086)	1.427*** (0.055)	1.196*** (0.029)
Affiliations	1.087 (0.080)	0.948 (0.090)	1.082 (0.058)
Funding	0.946 (0.090)	1.073 (0.226)	1.044 (0.095)
Projects	1.255** (0.094)	1.397 (0.375)	0.999 (0.086)
Conferences	1.167* (0.073)	1.069 (0.043)	1.020 (0.011)
Notes: Exponentiated coefficients; Standard Error in parentheses; Significance values starred = * p<0.05, ** p<0.01, *** p<0.001 a = Foreign is a category for the type of award with a reference category being domestic. b = Gender is a binary categorical variable with female as the reference category. c = Education level is a binary categorical variable with a Ph.D. being the reference category. d = Discipline is a categorical variable with "hard discipline" being the reference category.			

### ***International affiliations***

In the affiliation outcome, the patterns of international engagement across all the cohorts still suggest that study abroad affected the three cohorts in different ways. Considering substantive differences, the early career, and the advanced career cohorts indicate a possible increase in affiliations but the mid-career suggest lower rates for the foreign doctorates. Though differences manifested between foreign and domestic graduates, results were not significant across the three cohorts (Table 8.4).



When examined by cohort, foreign doctorates would have positive results for the early career faculty, but the difference had no statistical significance. Instead, the results revealed positive correlations between affiliations and the other dimensions of research. Conference presentations for the early career faculty would correspond to an increase in affiliations. An increase in conference presentations would correspond with an increase in rates in affiliations. Some dimensions of research engagement predicted positive correlations with international affiliation, but results were not statistically significant. Among them were; publications, collaboration, and funding. For the demographic factors; age and postdoc experience correlated with an increase in rates, but the result was not statistically significant. Other demographics factors including gender and discipline category were linked to decrease in affiliations, but they too were not statistically significant. Male faculty compared to females would have a reduction in affiliations. Similarly, faculty in the soft disciplines would have lower rates in affiliations. It seems that while a doctorate abroad makes a substantive difference between foreign and domestic graduates. International affiliation in the early cohort had no correlation with study abroad and even most of the confounding variables except conferences had no link with affiliation.

Within the mid-career cohort, the result indicates lower affiliation rates for faculty with foreign doctorates compared to domestic doctorates. The result shows that foreign compared to domestic doctorates would have lower affiliation rates other factors constant. Demographic factors especially age would negatively correlate with affiliation outcomes. Meanwhile, age would correspond to a significant decline

in affiliations, other factors constant. Furthermore, international conferences also had a significant and positive correlations with affiliation outcomes.

Meanwhile, most covariates for demographics and research engagement had no significant relationships with international affiliations. Gender, education level, and academic discipline outcomes all had no significance. Most research engagement dimensions also had no correlation with international affiliation for the mid-career faculty. Among research engagement dimensions; funding, projects, publications and collaborations had no significant association despite posting positive correlations with international affiliation. Given the evidence, it would appear that foreign graduates would have less affiliation rate in the mid-career. International affiliation rates at the mid-career stage would correspond with age but not the doctoral experience abroad.

The advance career cohorts suggest an increase for the foreign doctorates. The foreign-trained doctorates would have an increase in affiliations compared to domestic doctorates. However like in other cohorts for affiliation, there was no significant difference between domestic and foreign doctorates. The increase in the affiliation rates compared to results in the other cohorts would suggest mixed outcomes among the three groups and with no clear pattern. Even covariates for the advanced career cohort differ from the early and mid-career cohorts. International projects had no significant outcomes in the first two cohorts but were significant and positively correlated with international affiliation in the advanced career cohort. Like in the mid-career cohort international publications would still be linked with a significant increase in rates for affiliations. Covariates including; age,

gender, education and discipline category had no association with affiliation in the advanced career category. Furthermore, research dimensions including international conferences and funding had no correlation with affiliations. Arguably, even in the advanced years of experience, the impact of a doctorate was not statistically significant despite the substantive difference. Moreover, differences in affiliation between domestic and foreign-trained faculty were fluctuating for among the different experience cohorts. The three cohorts only shared publications and conferences as significant covariates.

Table 8.6: GEE table for Affiliations rates across graduate cohorts (N=795)

Variables	International Affiliations rates		
	Early Career	Mid-Career	Advanced Career
Faculty Cohort			
Foreign <sup>a</sup>	1.631 (0.813)	0.748 (0.383)	1.480 (0.694)
Age	1.149 (0.310)	0.577* (0.155)	1.233 (0.298)
Gender (Male) <sup>b</sup>	0.734 (0.454)	0.748 (0.265)	1.157 (0.582)
Education level (Postdoc) <sup>c</sup>	1.414 (0.732)	1.076 (0.362)	1.050 (0.482)
Academic discipline (Soft) <sup>d</sup>	0.598 (0.312)	1.161 (0.327)	1.190 (0.485)
Publications	1.035 (0.058)	1.058 (0.03)	1.104** (0.040)
Funding	1.016 (0.105)	1.080 (0.119)	1.209 (0.118)
Projects	0.912 (0.174)	1.061 (0.146)	1.133** (0.0539)
Conferences	1.134* (0.0632)	1.169*** (0.0458)	1.021 (0.0423)
Collaborations	1.019 (0.105)	1.015 (0.097)	0.936 (0.046)
Notes: Exponentiated coefficients; Standard Error in parentheses Significance values starred = * p<0.05, ** p<0.01, *** p<0.001 a = Foreign is a category for the type of award with a reference category being domestic. b = Gender is a binary categorical variable with female as the reference category. c = Education level is a binary categorical variable with a Ph.D. being the reference category. d = Discipline is a categorical variable with "hard discipline" being the reference category.			

### ***International projects***

Analysis for differences between domestic and foreign doctorates across cohorts suggested foreign doctorates compared to domestic doctorates in the early career years would decline in access to international projects (Table 8.5). Foreign doctorates would on the average decline in project rates by a factor of 0.45, other factors in the model being constant. To compound the outcome, demographics including age would also correlate with a decrease in access to international projects by a factor of 0.35 and the result was statistically significant. Even being

in the soft disciplines compared to the hard disciplines would be associated with lower rates in international projects although the result would not be statistically significant. Gender among demographics had a positive outcome. Male faculty compared to being female would have positive results with suggestions that males would have an increase in rates 6.81 times higher for projects. Although the result is statistically significant, the standard error appears large (6.05) and could possibly distort significance of the estimated values. Among dimensions of research engagement, collaborations equally had significant and increased projects for faculty per year. International publications, collaborations, conferences, and funding would correspond had no significant correlations with international projects. However, affiliations, which also lacked statistical significance had a link with a decline in international projects for the early career category. The implication of the results would be that the impact of study abroad in project engagement within the first 05 years of graduation would be less than for domestic graduates but would also depend on age, gender and the rate of collaboration by faculty.

In the mid-career cohort, the foreign doctorate group had substantively higher rate of global engagement than domestic doctorates. The results indicate that a foreign doctorate compared to a domestic doctorate would increase rates (1.60 times higher) for international projects, other factors constant. The substantive increase in rates for the mid-career cohort would contradict the decline in the early career cohort. However, the result did not have statistical significance. Moreover, unlike the early career group where age, gender, and international collaboration were

significant covariates, the mid-career cohort had international funding and conference presentations as significant covariates. International funding and international conference presentations had positive results for international projects. Therefore, funding and conferences would correlate with projects more than the foreign doctorate experience.

Most of the factors in the projects model were not statistically significant. Demographics including age and being male faculty were expected to correlate with increased rates. Age would correspond to an increase in rates (1.08 times higher) for international projects. In the same direction, being male compared to female faculty would correlate with an increase in rates (1.05 times higher) for international projects. In addition to demographics, the study examined the links with other dimensions of research engagement. International publications, affiliations, and collaboration had modest positive increases in rates for international projects but were non-significant. Therefore, like in the early category, there is no difference between the domestic and foreign graduates in global engagements in projects.

In the advanced career cohort, foreign doctorates had lower rates compared to domestic graduates and the outcome significant. The lower rates for the foreign doctorates in the advanced cohort is in sharp contrast to the no difference found in previous two cohorts. Other than the foreign doctorate, age and discipline would also have significant changes in engagements for faculty in the advanced career. Age was found to correlate with a decline in projects and faculty in the soft disciplines would also perform lower than in projects, other factors constant. On

the other hand, the high rate of engagement for projects under the advanced career cohort would relate with research engagement dimensions. Affiliations, publications, funding, conferences and collaboration had a positive association with project rates, but only affiliations positively correlated with international projects. Gender aspect in projects was not significant. The implication is that in more than ten years later in a career, a doctorate abroad compared to domestic doctorate would decline in international projects. Age, academic discipline, and international affiliations would correlate with international project rates.

For the early career, projects are associated with age, gender, and collaborations and not study abroad. In mid-career, projects are correlated with funding and conferences as and again not with study abroad. While considering international projects, the positive impact of study abroad (if any) appears to fade away quickly following the return to the country of origin. Moreover, the perceived increase in international projects for foreign doctorates in the mid-career group was even not significant.

Table 8.7: GEE table of results for project rates across graduate cohorts (N=795).

Variables	International projects rates		
	Early Career	Mid-Career	Advanced Career
Cohort			
Foreign <sup>a</sup>	0.452 (0.462)	1.597 (0.918)	0.121* (0.114)
Age	0.351* (0.174)	1.075 (0.240)	0.151* (0.125)
Gender (male) <sup>b</sup>	6.811* (6.048)	1.052 (0.470)	0.351 (0.403)
Education level (postdoc) <sup>c</sup>	1.115 (1.507)	0.785 (0.468)	2.088 (2.855)
Academic discipline (Soft) <sup>d</sup>	0.335 (0.286)	0.994 (0.432)	0.005*** (0.007)
Publications	1.159 (0.208)	1.022 (0.105)	1.007 (0.042)
Affiliations	0.831 (0.271)	1.007 (0.0864)	2.185*** (0.405)
Funding	1.131 (0.202)	1.607*** (0.184)	1.250 (0.195)
Conferences	1.037 (0.109)	1.134* (0.0571)	1.042 (0.030)
Collaborations	1.165 (0.098)	1.039 (0.199)	1.011 (0.046)
Notes: Exponentiated coefficients; Standard Error in parentheses. Significance values starred = * p<0.05, ** p<0.01, *** p<0.001 a = Foreign is a category for the type of award with a reference category being domestic. b = Gender is a binary categorical variable with female as the reference category. c = Education level is a binary categorical variable with a Ph.D. being the reference category. d = Discipline is a categorical variable with "hard discipline" being the reference category.			

### ***International conferences***

A comparison of foreign and domestic doctorates in the context of conference presentations revealed that the foreign doctorate in the early career group performed better than the domestic group in average presentation rates (Table 8.6). Foreign doctorates would have an increase in rates for conference presentations, but the difference would not be statistically different from the domestic doctorate. Most covariates including demographic factors suggested



increased conference presentations. For instance, age, male faculty, and faculty in soft than hard disciplines and a postdoc experience would all correspond to greater than before conference presentations. Faculty in the soft disciplines compared to hard disciplines would correlate with an increase in rates for international conferences. Male faculty compared to female faculty would also be associated with an increase in rates and age would also correspond to an increase in rates for conferences. A postdoc experience would correspond to an increase in rates for conferences. For all the demographic factors, only the postdoc experience was significant.

In addition to demographic factors, some engagement dimensions had positive associations with conference outcomes. International collaborations, projects, and affiliations had positive and meaningful relationships. However, international funding and publications were not significant. Judging by the results, conference engagements by faculty in the early career were more associated with activity in other dimensions of research particularly in collaboration, projects, and professional affiliations. Furthermore, the outcomes would depend on a postdoc experience and therefore less on the study abroad experience. Nevertheless, there is still a substantive difference between the foreign and domestic faculty that might be explained by the doctoral experience particularly in the early career years.

For the mid-career faculty, foreign doctorates performed better than the domestic doctorates in international conferences although the results still lacked statistical significance. Other factors constant, foreign compared to domestic doctorates would be expected to increase rates of engagement for international conferences

for mid-career faculty. Furthermore, demographic factors including age and education level had a positive relationship with conference rates. Research dimensions except international funding turned out to have positive and significant correlations with international conferences. Unlike for the early career faculty, age among mid-career faculty became a significant covariate.

Additionally, most dimensions of research engagement correlated with conferences for the mid-career faculty. Other factors in the model controlled. International publications, affiliations, funding and projects had a positive association with international conferences among mid-career faculty. Gender, academic discipline, and collaboration were not statistically significant. In conclusion, there was little difference between early career faculty and mid-career faculty. In both groups, foreign doctorates substantively performed better than domestic doctorates despite the lack of statistical difference. Hence, it might be fair to assume that study abroad still maintained a positive impact even among the mid-career faculty.

Among the Advanced-career faculty, the foreign doctorates compared to domestic doctorates had significantly lower average rates in conference presentations. Although engagements reduced for foreign doctorates at the advanced stage of career, many demographic factors also predicted low levels of engagement through academic disciplines, gender categories, and even for advancing age. Gender, in particular, had a significant difference. The increase in age, and being faculty in the soft than in the hard disciplines, had lower conference rates. Similarly, males compared to female faculty would be expected to have lower international

conference rates. On the other hand, a postdoc experience compared to a Ph.D. alone would have a higher outcome with rates increasing for conferences.

Dimensions of research engagement correlated with conference rates. For instance; international affiliations, funding, collaborations, and projects were positively and significantly correlated with conferences. International projects and international publications were linked to a decline in international conferences but were not significant. In conclusion, therefore, it could be argued that foreign doctorates have a substantive correlation with conference rates, but the association was not big enough to be significant.

Table 8.8: GEE table for international conference rates across cohorts (N=795)

Variables	International conferences presentation rates		
	Early Career	Mid-Career	Advanced Career
Cohort			
Foreign <sup>a</sup>	1.156 (0.767)	1.766 (0.850)	0.307* (0.152)
Age	1.089 (0.364)	1.512** (0.207)	0.920 (0.161)
Gender (male) <sup>b</sup>	1.118 (0.558)	0.933 (0.276)	0.221** (0.112)
Education level (postdoc) <sup>c</sup>	3.622** (1.744)	2.356* (0.959)	2.557* (1.083)
Academic discipline (Soft) <sup>d</sup>	2.257 (1.132)	1.340 (0.382)	0.580 (0.237)
Publications	0.974 (0.088)	1.116*** (0.031)	0.933 (0.095)
Affiliations	1.171** (0.071)	1.200*** (0.049)	1.230*** (0.065)
Funding	1.041 (0.112)	1.136 (0.086)	1.775*** (0.192)
Projects	1.279* (0.155)	1.371* (0.186)	1.026 (0.108)
Collaborations	1.271** (0.103)	0.924 (0.052)	1.232* (0.110)
Notes: Exponentiated coefficients, Standard Error in parentheses. Significance values starred = * p<0.05, ** p<0.01, *** p<0.001 a = Foreign is a category for the type of the award with a reference category being domestic. b = Gender is a binary categorical variable with female as the reference category. c = Education level is a binary categorical variable with a Ph.D. being the reference category. d = Discipline is a categorical variable with "hard discipline" being the reference category.			

## 8.6. Chapter results in summary

The chapter examined differences in international research engagements between foreign and domestic faculty for the different generations of study abroad following their completion of Ph.D. and return to the country of origin. The aim was to determine whether the impact of a doctorate abroad changed across generations following completion of study. The GEE analysis for the three faculty cohorts for the six dimensions of research engagement. Results of the analysis for the six outcome dimensions reflected mixed outcomes across cohorts. Outcomes were

that in a few dimensions, study abroad impact would be visible in the first cohort but with no group differences in the mid-career and or a decline in the advanced career. Across the cohorts, the dimensions of research positively correlated across but the outcomes of demographic factors were random.

In the funding dimension, study abroad differences were visible even among the faculty cohort of more than ten years following the experience abroad. However, the impact of a foreign doctorate appears to fade systematically with global engagement rates declining analysis moves from cohorts of few years for many years. However, the evidence is weak because the differences across cohorts were merely substantive and non-significant. Despite, the weakness of the statistical results, it is worth pointing out that the consistency found across cohorts is quite compelling. On the other hand, funding was found to correlate with; age, postdoc experience and academic discipline were relevant covariates in explaining the impact of a doctorate abroad across the different cohorts. Furthermore, affiliation, publications, projects, funding and collaborations each had implications for funding outcomes given variation in levels of activity on each. The funding dimension was among the dimensions where the study abroad impact was visible.

For conferences, foreign doctorates performed better than domestic graduates among early career and mid-career despite no statistical significance. Even though the differences for a foreign doctorate were non-significant, the objective differences were large enough to warrant attention. However, advanced career cohort, foreign doctorates compared to domestic doctorates had lower average rates in international conference engagements. The most impactful among

demographic factors across the different groups was the postdoc experience. Others include age and gender. Among the dimensions of research engagement, international affiliation was essential across all groups. Other dimensions relevant to some of the groups included; publications, funding, projects, and collaboration. The conference dimension was among the few dimensions that reflected positively on the study abroad impact for the first ten years of an academic career and negative in subsequent years of a university career.

The publication dimension was different. Within the publication outcome, the result suggested no differences between foreign and domestic doctorates for all the career categories. However, there were objective differences such that domestic doctorates are on average were better than foreign doctorates in international publications. Meanwhile, age, postdoc experience, academic discipline were the key demographics linked with publications. Even other research dimensions especially; collaborations, conferences, funding, and affiliations were found to correspond to increased publication rates. The International publication dimension represents dimensions with no study abroad impact across career cohorts.

Results for the collaboration dimension presented a no statistical difference in outcomes between foreign doctorates and domestic doctorates. In substantive terms, the results had mixed outcomes even among cohorts. The mid-career cohort had a negative result for a foreign doctorate when compared with domestic doctorates in international collaborations. Despite being non-significant, the results under the early career and advanced career cohorts showed an objective increase in collaboration rates for foreign compared to domestic doctorates. Under

demographic factors; age, postdoc experience and academic discipline would affect outcomes. For the research dimensions, publications, affiliations, projects and conferences did correlate significantly with collaboration rates. Collaboration dimension represented another case of no study abroad impact although objective differences stood out for a foreign doctorate.

In the affiliations dimension, there was no significant difference between domestic and foreign doctorates, but there were objective differences. Affiliations had the same mixed pattern like collaboration outcomes and without a statistical difference between foreign and domestic doctorates. Foreign doctorates had higher average affiliation rates in the early career faculty cohort but had lower rates in the mid-career cohort and again higher rates in the advanced career cohort compared to the domestic graduates. One of the impactful demographic factors was age, while in the research dimensions; publications, funding, projects, and conferences correlated significantly with affiliations. The affiliation dimension was a typical case of no difference and with no clear pattern even among the three generations of study abroad.

Under the project dimension, the impact of study abroad would also present mixed results over the years. Within the first 05 years of graduation, foreign doctorates would on average be less engaged in international projects than for domestic graduates. Foreign doctorates in the mid-career had higher rates of engagements but those in the advanced career lower rates when comparing with domestic graduates. Outcomes significantly correlated with covariates; age, gender and

faculty collaborations. International projects was again another dimension with mixed results for the study abroad generations.

In conclusion, results revealed that across the years, foreign doctorates and domestic doctorates did have statistically significant differences but only in a few cases. Such a case was in the early career cohort of the funding dimension which had higher engagements for foreign doctorates. The other cases were in the advanced career cohort for the projects and conference dimensions. Differences in outcomes for the rest were mainly substantive and often for the foreign doctorates. Study abroad seems to affect different cohorts in various ways. International publications and funding had consistent outcomes for foreign doctorates across the three cohorts (systematic decline). Collaboration and Affiliation outcomes were mixed but all non-significant and could be said to be consistent (Mixed outcome). Projects and conferences had mixed outcomes with a decline in outcomes in the advanced cohort (significant and systematic decline).

### **8.8. Discussion**

The chapter aimed at determining the durability of the study abroad outcomes across generational cohorts. The study examined the assumption that study abroad outcomes in research would have a systematic decay over the years. The study outcomes suggest overall the patterns reflect a systematic decay with only one surprise of a mixed result. Three categories of outcomes came up; consistent but non-significant impact across cohorts; consistently non-significant but with the



mixed result; and the declining impact across cohorts. Each research dimension falls under one of the three categories and discussed by category.

### ***Systematic non-significant decline***

Publications and funding dimensions showed same impact patterns across the three cohorts. Under publication, the pattern showed consistently low values for foreign doctorates which kept declining across the three cohorts. It suggests that for faculty at different stages of career life the impact of the foreign doctorate remains lower than a domestic doctorate and continues decline by generation. The outcome is contrary to the view by Yang & Lee (2012) that study abroad graduates published more in international journals. Instead, the study reinforces recent findings that study abroad does not improve productivity (Shin, Jung, Postiglione & Azman 2014). In addition to foreign doctorates performing lower than domestic doctorates, the impact of study abroad on publications fades across generations and with the third generation having the least impact. Although the results could be non-significant, the pattern of values across the three generations reflect the diminishing nature of a foreign doctorate over time.

The funding dimension represents the opposite of the outcomes in the publications dimension. The foreign doctorates on average consistently accessed more funding than the domestic doctorates across the three cohorts. Sourcing funds outside higher education systems has become common owing to dwindling government grants for research (Kyvik & Aksnes 2015). While the foreign doctorates are less cosmopolitan in publication than domestic doctorates, they are more engaged with

sourcing international funding. Although some argue that faculty accessing increased funding tend to publish more (Chudnovsky et al. 2008), the case in Uganda is the opposite. Global engagement in the study bears a characteristic of low publication patterns amidst increased access to funds. Social scientists in East Africa are noted to be more involved in hired consultancy work (Wight 2007). The low publication rates among foreign doctorates could have links with the high level of consultancy. Consultancy work can impose limits on the research publication and thereby cripple publishing in academic journals. Despite the engagement bias, the consistent decline of access to international funding also suggests the declining impact of a doctorate study abroad across generations.

### ***Mixed patterns in the outcome***

The second category composed of collaboration and affiliation dimensions showed no significant association with study abroad outcomes across cohorts. Surprisingly however, both dimensions also showed lower outcomes in the mid-career cohort, but the early and advanced career cohorts had high values for study abroad.

A high level of collaboration is essential in an academic career. Kyvik & Aksnes (2015) attributes increased collaboration to the emergence of a new generation of academics with a cosmopolitan outlook to research than previous generations. Others, however, consider the importance of collaboration to publications and maintain that academics who studied abroad tend to have more international contacts and those with a higher number of contacts abroad also publish more in international journals (Good 2005; Lee & Bozeman 2005). It would be natural that

patterns of collaboration would be self-replicating and lower rates of observed outcomes for the study abroad graduates would be ruled out across cohorts. In light of the results, collaboration pattern would be expected to be higher for study abroad. Though not significant, high international collaboration would be expected even among faculty in their advanced career of more than ten years. Whether a new generation of researchers has emerged remains unanswered but what appears clear is the growing approach to research. In the new approach, foreign doctorates with more international contacts have more international collaborations (Kyvik & Larsen 1994). The study demonstrates that collaboration is embraced by all generations of researchers; young and old. Although the evidence is weak, study abroad graduates appear more advantaged in international collaborations. The surprising low rates in the study abroad outcomes in the mid-career cohort, however, needs further investigation.

Affiliations had a similar pattern of study abroad impact like in collaborations. Again there was a reduction in the study abroad impact for the mid-career cohort even for the affiliation dimension. Study abroad would be expected to increase affiliations to international societies especially in countries where the doctorates were obtained. Study abroad acts as a strong starting point for doctoral graduates to gain initial membership in professional societies and later keep renewing them. Becoming a member has diverse motives. Markova, Ford, Dickson, & Bohn (2013) indicate that tangible benefits and excellent customer service were necessary for membership. In addition, they suggest that member satisfaction and potential renewal of membership correlated with values including; access to conferences,

publications, and certification. Faculty who have experienced the benefits of belonging to international societies were therefore more likely to maintain memberships as well as acquire new memberships. Such motivations could account for the increased affiliation rates in both early and advanced cohorts, and leading to suggestions that study abroad impact is durable across generations. However, there is a need to account for the discrepant sharp decline in the mid-career cohort. Besides, suggestions that membership in societies is affected by age, gender and academic discipline (Diamond & Haurin 1994; Mauleo'n, et al. 2013) had no support within most of the cohorts. Therefore, study abroad could be one way to gain early access to academic societies.

### ***Systematic decline in outcomes***

In the last category, values of global engagement rates in projects and conferences were significantly lower in the advanced cohort and implying that at an advanced stage of career study abroad impact completely fades leading to a lower performance, and domestic doctorates even overtake foreign doctorates. There are challenges with the lack of information on available fellowship or job opportunities, visa requirements, social security, fiscal matters and life in a foreign country (Lola 2005). Such work could also be disruptive to family life, and many academics might opt for alternative and more rewarding pursuits. Perhaps the attempt to minimise problems linked with many global research assignments leads many faculty to consultancy work while being based in one locality. The reluctance to go through the hurdles of living and working in a foreign country could act as a disincentive for global projects. Study abroad graduates with firsthand experience

would find it less attractive given an alternative in consultancy. Above all, it could also indicate that the advantages of study abroad probably wane, and the domestic graduates could have gained global expertise for competitive global engagement.

In conference attendance, the pattern was the same. Foreign doctorates performed less than domestic doctorates in the advanced category. According to Kyvik & Larsen (1994), contact frequency regarding conference attendance positively correlates with international publishing. Considering that faculty with domestic doctorates on average attended more conferences, it might explain their increased publications over and above the foreign doctorates. The low participation of foreign doctorates in international conferences after a period of 10 years can lead to a conclusion that the study abroad impact on conferences diminishes at the advanced stage. Moreover, at that stage, even the domestic doctorates would have gained adequate experience in global engagement and therefore equally becoming more competitive.

### **8.9. Conclusions**

The durability of study abroad outcomes is little addressed in the literature. The study deliberately considered the aspect of the sustainability of study abroad outcomes. The study reveals the declining nature of study abroad outcomes to the extent of sharply declining to levels lower than domestic doctorates ten years following completion of a doctorate abroad. The decline cuts across all dimensions although it manifests in different patterns across the six dimensions of global engagement in research. The decline suggests a generational decay for study

abroad outcomes in higher education. Graduates who have lived in home countries for many years following study abroad are likely to have lesser study abroad outcomes than recent graduates. Sustainable global engagement for researchers in higher education probably calls for a renewal of study abroad experiences. Currently, academic renewal could take the form of a postdoc or a sabbatical. However, the periods are often short and possibly with limited impact. Perhaps longer periods of work or study experience abroad from time to time would stem the decline in global engagement for higher education faculty. Furthermore, a more detailed examination of durability could be undertaken to probe into specific years of the academic career compared to the current approach that clusters duration into generations. Such studies could also clarify on some of the surprising outcomes encountered and highlighted in the current study.

## **Chapter 9 : Summary, Implications, and Limitations**

### **9.1. Introduction**

The study was conducted to determine the relationship between study abroad experiences and global engagement in research for higher education faculty in a low-income country. Using the LCVA method, the study examined study abroad outcomes on global engagement within the context of research for doctoral graduate returnees in higher education faculty in Uganda. The GEE statistical method was used to analyze data with a focus on four specific research concerns. The study covered; the overall outcome of study abroad on global engagement in research, the relationship between study abroad and the research specific dimensions of global engagement, the link between specific study abroad factors and the research specific dimensions of global engagement, and the durability of study abroad outcomes in research across cohorts. The aim of this chapter is to provide; a summary of results for each research question, an assessment of the Implications to policy and practice, the challenges of using the LCVA method and the overall shortcomings of the study. To achieve the aim, the structure of the chapter reflects on the research questions, followed by implications organized according to the questions, then challenges of the method and finally limitations and concluding remarks about the study.

### **9.2. Study abroad outcomes on global engagement in research**

Research on study abroad outcomes has had a limited coverage. Historically it focused on assessing educational outcomes (Carlson, Burn, Useem, and

Yachimovicz's 1990, Sutton and Rubin, 2004) and investigating foreign languages gains following a sojourn (Cubillos, Chieffo, & Fan 2008; Saviciki 2008). Others examined intercultural competencies of returnees (Williams 2005, Shaftel, Shaftel, Timothy, Ahluwalia & Rohini 2007, Fuller 2007, Rexeisen, Anderson, Lawton, & Hubbard 2008, Salisbury, 2011). The kind of career decisions made by foreign trained graduates following return draws much attention in recent times (Bachner 2009; Engel 2010; Teichler & Kerstin 2007; Mahajeri & Gillespie 2008; Wiers-Jenssen 2005; Wiers-Jenssen 2011; Wiers-Jenssen & Try 2005). A few studies address outcomes on global engagement. The link between study abroad and global engagement was provided under the aspect of social justice by Paige et al. (2009) but the study had the limitation that the professional value in global engagement following study abroad still needed further study.

The current study establishes a quantified relationship between global engagement outcomes in research for higher education faculty and study abroad experiences. The study assessed results of global engagement in research following a doctorate abroad by comparing foreign and domestic doctorates the total of engagements. Based on the assumption that foreign doctorates would become more globally engaged than domestic doctorates, the study suggests that study abroad had positive outcomes on global engagement in research. The result supports theoretic assumptions of the social capital theory that social capital is still need in the context of a Sub-Sahara Africa country despite the flattening of the world suggested by the flat world theory.



The outcomes, when examined across gender categories, revealed that male faculty benefited more than females. Within academic disciplines, the soft disciplines benefited more than in the hard disciplines. Furthermore, differences were also more pronounced among Ph.D. than among the postdoc category and finally, lecturers other than professors made a difference. The results however, could have different implications for policy and practice as discussed in the relevant section but for now, the study has conclusions on a specific outcome.

### **9.3. Study abroad outcomes across specific forms of research engagement**

The current study also examined study abroad outcomes across research specific forms of engagement. Unlike previous studies that consider only a few research outcomes as measures of research productivity, the current analysis involves six research forms of engagement; international publications, collaboration, affiliation, funding, projects, and conferences.

Previous studies were less unanimous on outcomes of study abroad on international publications. Findings by Shin, Jung & Azman 2014 suggest no differences between foreign doctorates and domestic doctorates in research and that even objective outcomes would be in favor of domestic doctorates. In contrast, Yang & Lee (2014) suggest that foreign graduates published more and in addition attended more international conferences than domestic doctorates. The reason for variation might be due to the fact that the latter study focused on publications by faculty from Library information services and considered only high impact journals.

When journal ranking and quality of publications are included in the assessments, it is more likely to change observed patterns.

The current study had a unique sample, and less selective data from diverse disciplines and across international journals. The outcomes were consistent with the results from a study employing sample data from specific disciplines and journals. The result was that domestic doctorates were equally competitive and on average even published more than foreign doctorates (Shin, Jung & Asman (2014). The baseline model also suggested that foreign doctorates had greater access to international funding than domestic doctorates and no significant differences among faculty were found in other dimensions. The analysis suggests the importance of grants and consultancy to foreign doctorates and further analysis tracks its categories of engagement within the dimensions of research.

Within the educational levels, study abroad graduates were more globally engaged than domestic doctorates and with suggestions that doctoral graduates would benefit more in global engagements through postdocs abroad even for those with domestic doctorate. Foreign doctorates than domestic doctorates in the Ph.D. category have more access to international funding and reinforced evidence to the idea that study abroad experience has positive outcomes on levels of global engagement. Meanwhile, postdoc faculty with foreign doctorates also had significantly higher publications and affiliations compared to domestic doctorates. The difference suggests that faculty with a study abroad background benefit more from the postdoc experience particularly in relation to international publications and affiliations. Although outcomes in the first research question showed that both

foreign and domestic doctorates benefit from a postdoc experience, the results in the current question, indicates that foreign doctorates benefit more from a postdoc than the domestic doctorates. The outcome could be linked to their ability to cope with study in foreign destinations. On the other hand, foreign doctorates in the postdoc category were found to have lower engagement rates with respect to access to international projects and conferences.

There could be different explanations for the low rates of engagement for foreign doctoral graduates in international projects and conferences. It could be attributed to the lack of connectedness to the local research networks to enable foreign doctorates participate in existing international projects linked to the local employing institutions and the strong passion for consultancy and grant research. For conferences, foreign doctorates might have little to offer at international conferences given that they are more involved with hired work that may only be for the funding audiences and not intended for international audiences. Therefore, the charm of hired work in addition to the faculty salaried job and when done could increasing distort outcomes on other dimensions of research and could reflect differently on study abroad graduates when compared to domestic graduates.

Across disciplines, having a foreign doctorate has an added advantage. Differences in favor of foreign doctorates within both hard and soft disciplines were located in international affiliations and access to international funding. Faculty in both hard and soft disciplines would enhance global engagement levels through study abroad. Previous research linked study abroad to international career outcomes. It alluded to preference by foreign trained graduates for jobs with

companies with an international orientation (Bachner 2009; Engel 2010; Teichler & Kerstin 2007; Mahajeri & Gillespie 2008; Orahod, Woolf, & Kruze 2006, Wiers-Jenssen 2005; Wiers-Jenssen 2011; Wiers-Jenssen & Try 2005). It is no surprise that foreign doctorates across disciplines, had interest being affiliated with international professional societies and at the same time access grants and consultancy services with international agencies much more than domestic doctorates. It would suggest that even for different disciplines, study abroad outcomes would maintain similar patterns. As expected, foreign doctorates get affiliated to foreign professional bodies during their study abroad.

Within the academic ranks, study abroad remains a better alternative across categories. Both foreign trained lecturers and professors enjoy preference by international funding agencies. Differences between a foreign doctorate and domestic doctorates in access to funding were revealed to be among both the lecturers and among the professors. This was in line with the assumption that foreign doctorates would have greater access to international funding than domestic doctorates even across academic ranks. Under affiliations, lecturers than the professors had differences in affiliation rates in favor of foreign doctorates. This was no surprise considering that lecturers are in the lower academic ranks are likely to be dominated by fresh doctoral graduates who come with their affiliations when taking up academic jobs. Foreign doctorates would therefore have an upper hand in international affiliations because they may already be affiliated with professional societies in countries where the doctorate was obtained. On the contrary, the professors are likely to be long-serving faculty and could have lost

their international affiliations as a result of loss of interest due to continuous payments of membership renewal fees and little motivation on attainment of professorship.

Across the gender categories, a foreign doctorate had mixed fortunes. Study abroad experience makes little difference among female faculty but makes a remarkable difference in outcomes among male faculty. Foreign trained male faculty were more likely to be global engaged than their counterparts who studied in domestic institutions. Differences found in the funding dimension were in favor of foreign doctorates among male faculty. In affiliations, the differences in favor of foreign doctorates were found among male than female faculty. The absence of differences among women across all dimensions could partly be attributed to the long-held perceptions that female faculty are less productive in research than the male researchers (Bird 2001). In the case of Uganda, it might also be compounded by the domestic responsibilities placed on women in the African context where women do most of the domestic work and therefore might have limited time for research activities. On the other hand, male faculty would have more time for research and career development. Even though female faculty might be competent researchers they could be constrained by domestic responsibilities and the study abroad experience could count little towards advancing their ambitions.

In the overall assessment foreign doctorates had positive outcomes mainly in terms of access to international funding and affiliation to professional societies among higher education faculty in Uganda. Study abroad however had little influence on the results in publishing, collaboration, projects and conferences.

Among other dimensions of study abroad, no differences were found. The absence of a difference with domestic doctorates in other dimensions might be attributed to the issue of subversion by hired consultancy work and which undermines effort in other research dimensions. It must be recalled that most dimensions had positive and higher rates of engagement despite not being significant. Nevertheless, indulgence in one dimension still has implications on other outcomes. How can study abroad be used to enhance outcomes on the four dimensions that have shown absence of significant difference with domestic graduates? The implications for practice are diverse.

#### **9.4. Study abroad factors association with global research engagements**

Together with examining the outcomes of study abroad, the study also examined specific study abroad factors that might be associated with global engagement outcomes in research. To that effect; depth, destination, duration and the specific demographic factors were examined with the assumption that the three components together with demographic factors would explain changes in rates of global engagement in the research dimensions. Several models were developed to test the assumption and the results were rather mixed hence possible diverse conclusions from the same outcomes.

##### ***Duration as a factor of study abroad***

The study revealed that the longer the duration abroad, the higher the levels of global engagement. The argument that longer durations abroad are better than shorter durations regarding global engagement outcomes has for long been

presented (Dwyer 2004, Medina-Lopez-Portillo 2005, Sasaki 2011). The arguments nevertheless have alternative views that duration abroad did not matter so much in the outcomes (Kyvik & Larsen 1994). Fortunately, Kyvik & Larsen suggest that it is the number of contacts made abroad which is important and not duration per se. However, it is also reasonable to suggest that common sense that staying longer helps build more meaningful contacts. It is, therefore, tempting to believe that duration affects outcomes.

The current study suggests that the argument for longer durations is particularly more relevant to the hard disciplines as it improved possibilities for international affiliations and funding opportunities. The positive influence on affiliation was found to be strong for faculty in the hard disciplines than soft disciplines. It also had a positive bearing on the number of international publications in the hard disciplines. Although duration correlated to international funding, the relationship has no association with a specific academic discipline category. From the gender perspective, more years abroad would allow both male and female faculty to have more international affiliations. In particular, foreign trained male faculty, more than their male domestic counterparts were more likely to have an increase in international funding correlating with a longer duration abroad.

To the extent that domestic doctorates did not surpass foreign doctorates in global engagements, the result was consistent with expectations of the study. Faculty spending many years abroad would be expected to have gained experience abroad and therefore would have increased the number of international affiliations before returning to countries of origin. Furthermore, longer years of study and work

experience builds international credentials for faculty to access consultancy work with international agencies following return. While returnees may find favour in the hard disciplines, it is not the case in the soft disciplines. The explanation might be that faculty who spend many years abroad get disconnected from local dynamics and funding agencies might prefer employing a more grounded person than returnees with a limited grasp of the context.

### ***Destination as a factor of study abroad***

Destination factor represented the level of development of the country of study, and the measure linked to the Human Development Index (HDI) of the country where the doctorate was obtained. The higher the HDI of a chosen destination country, the more developed the destination country and the more the expected outcomes. Although Paige et al., has the view that destination did not matter on subsequent global engagements in aspects of social justice, the outcomes are contradictory to expectations concerning research engagement. The current results for destination indicate that faculty who studied in more developed countries (countries with higher HDI) were more likely to have higher levels of collaboration, lesser access to international projects, and with greater international publication benefits among female faculty. Among returnees from more developed destinations, international collaboration would be higher mainly in the soft disciplines, but access to international projects would be lower in the hard disciplines. Under gender categories, male faculty returning from more developed destinations collaborated more with international peers but had challenges gaining access to international projects and were less likely to have international



affiliations. Despite the result that returned faculty from more developed countries collaborated more, and aware that more collaboration is linked to increased publications, the increase in collaboration had no corresponding increase in international publication outcomes among the male faculty. Instead, only female faculty benefited more in terms of increased publications and thereby suggesting that study abroad would benefit mainly females especially in international collaboration and publications.

Although it would be difficult to explain outcomes from the point of view of literature, the results of the first research question had clear indications that male faculty and especially in the hard disciplines were more involved in contract consultancies with international agencies and with productions that may not necessarily be for international publication. Sometimes, the difficulty of penetrating existing research networks in local institutions and the lack of simple and more appropriate technical equipment in specialized disciplines explains global engagements of foreign-trained doctorates. This outcome would partly explain the apparent lower levels of access to international projects. In addition, grants might also explain the low levels of international affiliations over time and international publication rates among males compared to among female faculty who have studied in similar countries but maintain collaboration.

### ***Depth as a factor of study abroad***

Depth is an index that measures the intensity of the study abroad experience. More scores on the index meant greater depth and had the implication of high-intensity

study abroad experience. The more intense the experience, the more the expected outcomes in global engagement. Lesser intensity might include going to non-English speaking countries, had no internship or research experience abroad, did not study abroad before Ph.D. and did not study abroad at all. The study suggests that faculty with more intense study abroad experiences would become more globally engaged particularly through international conferences. The results echo well with early studies indicating that in-depth experience contributes positively to later career life (Norris & Gillespe 2009). The benefits were more in the hard disciplines than soft disciplines. Not only did faculty in hard disciplines increase in conference rates, but they also had a high rate of increase in international collaborations. The surprise was that the hard disciplines had a drop in international publications despite the intensity of the experience. The explanation would be that in circumstances where conference papers have no links to mainstream journals, it is possible that faculty who attend more conferences were less likely to publish in journals. Alternative publication channels are especially understandable in the context of ongoing research work and is usually more common in hard disciplines than soft disciplines. It might still be valid to argue that the more intense the experience, the better the outcomes. Therefore, the approach to increased global engagement would be to target high-intensity study experiences involving; a study abroad experience, study abroad before Ph.D., English-speaking destinations, and among others involve internship and work experience abroad.

### ***Age as a demographic factor of global engagement***

The outcomes are that faculty in the hard disciplines are affected by age more than faculty in the soft disciplines and therefore the need to evaluate age by discipline when selecting participants for study abroad. Age is known to have a curvilinear relationship with research productivity but with variations by discipline (Kyvik 1990; Rosterd & Arknes 2014). Since then many studies have considered the effect of age on productivity but with hardly any focus on global productivity or global research. The present study suggests that age had both positive and negative outcomes for different dimensions. Aging is a negative influence on international publications, international affiliations and access to international funding. The effect was particularly more in the hard disciplines where it had a negative impact even on international projects. The negative influence on the hard disciplines is linked to the rapid changes in knowledge and technology with potential challenges for older faculty to keep at pace and hence the decline (Kyvik 1990). Patterns in hard disciplines differ from patterns in the soft disciplines. In the soft disciplines, older faculty tend to be more engaged globally with advancing age. They continue to have high rates of international collaboration, publications and conference participation per year compared to faculty in the hard disciplines. The pattern is attributed to increasing mastery of the field over the years. Across gender, age still had a negative outcome for both male and female except in international conferences where age continues to have positive results for both categories. The increased participation in conferences might be difficult to explain, but age is an important aspect of global engagement. Given that age affects outcomes differently, the study has the implication that when considering faculty for capacity

development abroad, faculty in the hard disciplines ought to be assessed differently in comparison to the soft disciplines when considering age.

### ***Gender influence as a factor of global engagement***

Gender is among the most impactful factors of study abroad although its outcomes remain controversial particularly in the context of research productivity. Some scholars argue that females are less engaged than males in research activity including affiliations to professional bodies (Diamond & Hurrin 1994). Others including Bird (2014) suggest that female productivity was a function of their proportion in the disciplines. However, aware of ongoing debates, the study anticipated no differences between male and female faculty in their research engagements across dimensions. On the discussions on gender productivity, the current study takes a position that gender had implications for global engagement. Male faculty participated more in international projects than female faculty and found particularly more pronounced in the hard disciplines. Male faculty, in addition, published more in the hard disciplines than females but declined in the soft disciplines. As already observed, international projects could involve much travel, and this could disadvantage female faculty with family obligations. On the other hand, women are few in the hard disciplines, and this tends to diminish support and inspiration for female entrants into the hard disciplines (Manleo'n et al. 2013). The gender composition in an academic discipline need to be taken into account during evaluations of faculty performance.

### ***Education level as a factor of global engagement***

Under the education categories, Ph.D. and postdoc experience were compared on all the six forms of global engagement in research. Postdoc experience offers additional research experience and has positive outcomes for global engagement. There was significant evidence of the postdoc impact in the dimensions of international funding and international conference presentations. Faculty with postdoc experience were more likely to have greater access to international funding and international conference participation. Postdoc faculty in both hard and soft disciplines performed far better than Ph.D. faculty in conference presentations. Across academic disciplines, postdoc faculty in hard disciplines published more and even got more international funding in the soft disciplines than those with Ph.D. only. There was no doubt that a postdoc study abroad adds value to international research experience of the faculty. Although postdoc faculty in soft disciplines, published less than the Ph.D. category, the outcome needs caution because of the low numbers of postdoc faculty in the study sample. The fact that it increased performance in other dimensions offers reasonable grounds for positive outcomes following a postdoc experience.

### **9.5. Endurance of outcomes across generations**

For how long do study abroad experiences continue being associated with changes in outcomes? This question has hardly been directly confronted in previous studies. The current study evaluates differences in outcomes for different cohorts of study abroad graduates. However, researchers have demonstrated interest in the long-term outcomes of study abroad and with various outcomes for global engagement (Murphy et al. 2014) and career choices (Wiers-Jenssen 2007).

In the current study, three generational cohorts for differences in global engagement outcomes between foreign and domestic doctorates were examined. Outcomes were expected to be in favour of the foreign doctorates. The assumption was supported in the early-career cohort but only in some of the dimensions. Following comparison of foreign and domestic groups on global engagements, foreign doctorates had greater access in the first five years following a Ph.D. abroad but with no differences for cohorts of more than five years. On the other hand, global engagement was lower among faculty with more than a decade following a doctorate abroad and that was found specifically in international projects and international conferences. Overall, the average differences in engagement for foreign doctorates were higher than domestic doctorates in the early years than in later age cohorts.

The decline in engagements for later cohorts compared to the increments in the Early-cohort suggests the limitations of study abroad impact for different generations of study abroad. Others could argue that the increments are a function of an emerging new generation of more international researchers compared to previous generations (Kyvik & Aknses 2015). Noting that few studies have considered examining the long-term study abroad outcomes over the years, the study outcomes had little corroborating evidence from the literature. It, however, emerged that over a ten year period, it appeared that the advantages of study abroad diminish and in some dimensions graduates even deteriorate compared to domestic graduates. Aware that the current study compared model outcomes for different cohorts rather than change over time for a specific group, a more robust

evidence consisting of the same cohort would provide better insights into the rate of change over time.

### **9.6. Implications of the study for policy and practice**

The implications of this study are broken down into categories directly linked to the respective research questions and the LCVA method. The first subsection deals with implications based on overall global engagement outcomes in research. The second subsection is related to the results in specific research dimensions. The third subsection discusses implications of study abroad factors, while the fourth subsection is a response to the durability of outcomes in research. In the last subsection, discussion focus on the implications regarding the use of LCVA method for researcher practice.

#### ***Implications on overall global engagement outcomes***

For the students and student sending countries, study abroad experience is a rewarding experience for beneficiaries. In as long as the benefits are however limited to a few categories, there is a need to maximize outcomes by prioritizing areas of maximum rewards. Host institutions need to provide programs that satisfy the student, funders and even student sending countries. Specific category analysis by academic discipline, education, academic rank and gender would be important considerations in decision making for beneficiaries.

Postdoc training which in the case of Ugandan institutions is often done abroad is of great benefit in enhancing capacity for global engagement. Postdoc research

experience often done abroad tends to mitigate for differences between those who had a doctorate abroad and those with domestic doctorates. It benefits both foreign and domestic doctorates to the extent that there are no significant differences between foreign and domestic doctorates following a postdoc experience. Therefore, for Uganda to better address differences in outcomes arising from different doctoral experiences, a postdoc experience abroad could be considered to mitigate weaknesses of domestic training. With a view of improving global engagement in research, the same could be recommended for those who obtained a doctorate abroad.

It is also worth pointing out that comparisons between male and female research productivity tend to portray females as less productive than the males. Therefore, in identifying the outcomes of study abroad in global research, the analysis needs to be sensitive to known outcomes. To better assess the outcomes of study abroad, the current study compared females with females and males against males. The outcomes would easily lead policy makers to prioritize sending males for study abroad with a view of enhancing global engagement in research. However, the sample for females is small, and the outcomes of study abroad in higher education would less likely be narrowed down to research alone. It would be therefore important to consider outcomes in other domains of higher education including teaching and administration.

In the academic disciplines, the absence of difference between foreign and domestic doctorates in the hard disciplines was linked to possible technological disparities between the study destinations and Uganda. Returnees often find the



disparity between training and the work environment at home in terms of expensive research equipment and materials and hence loss of initiative for research. Given that this might be the case for most low-income countries, it is also evidence for lack of planned training and specialization on the part of student sending countries. Specialization is needed to have prioritized disciplinary areas supported by corresponding infrastructural investment in domestic institutions. As a resource constrained country, weaknesses in research systems in Uganda are magnified by attempts to cover many unplanned disciplinary areas amidst scarce resources. There is a need to specialize and gain global competence in a few but core disciplines that would make institutions and the country competitive and relevant in the world of research than having a scattered effort that leads to nowhere.

Promotions sometimes have an adverse impact on productivity and in could in the same way negatively affect global engagement. Beckmann & Schneider (2013) suggest that promotions could have an effect on faculty publications. Therefore, hurried promotions for young faculty might impact on productivity especially when faculty attain the highest rank of professorship and later find no incentive for more effort. At the level of professor, no more significant differences were found between foreign and domestic doctorates. Academics attaining the rank of professor are often the most prolific in terms of research. However, when research performance is linked with promotions, chances of disorienting academics and producing target workers could increase. The research initiative among academic could easily diminish across foreign and domestic once no more incentives are awaiting them. There is a need for the continued provision of additional incentives that would

promote the drive to achieve more, and this might involve opportunities for salary and allowance negotiations beyond existing university scales to maintain the research momentum.

***Implications for outcomes in specific forms of research engagement***

Unlike past studies that examine research productivity on the basis of research publications, the current study brings into consideration additional forms of research engagement. Within research practice, the study brings out the relevance of other dimensions of research engagement often little considered in assessing productivity. Although the current study is exclusively on global engagements, it nevertheless suggests other dimensions that are often given less attention in evaluating research productivity. It also has the implication for the importance of exercising caution when making judgments on expected returns from a study abroad experience among graduates and avoid quick conclusions basing on a few parameters. Aware that study abroad has significant outcomes mainly in access to international funding and international affiliations, the drive to improve study abroad outcomes could now focus on the remaining dimensions including; international collaboration, international publications, access to international projects, and international conferences. Otherwise, the null hypothesis suggested by flat world theory that everyone can now compete at par with everyone could be assumed to be gaining ground. Obviously, such an assumption would only be relevant within a given geographical location but still counts more against the importance of a foreign doctorate. Moreover, the funding and affiliation dimensions had several differences found among categories including; gender, academic rank,

education level, and academic discipline which seemed to suggest other strong influences on outcomes other than study abroad.

Focusing more on the dimension of international collaboration, Uganda needs to develop its research specialization for future collaboration. Small countries like Uganda are often constrained in two ways when seeking collaborators. Small countries face financial constraints to access expensive research facilities (Melin and Persson 1996) and their researchers also face difficulties of finding collaboration partners within national borders (Katz & Hicks 1997). On the contrary, significant research communities have far more collaborative articles because they easily find collaboration partners with the country (Luukkonen, Tijssen, et al. 1993). Aware that collaboration arising from access controls yields co-authored publications, and collaboration driven by capacity building partnerships rarely contributes to co-authorship (Engels and Ruschenburg), Uganda needs to place less attention to capacity driven collaborations when identifying mechanisms of improving future research competitiveness of the country and the same could be said for higher education institutions. More meaningful international collaborations are only possible when the country has been able to develop its research specializations that form the basis for future international collaborations.

Furthermore, there is need to consider geographical proximity when contemplating study abroad destinations. Despite technological advancements, geographical proximity still affects the intensity of international collaboration patterns (Hoekeman, Frenken & Tijssen, 2011). The closer the destination country, the higher the potential for collaboration. Global engagement through international

collaborations could be improved when potential collaborators are closer and maintain contact. Closer contacts emerge and can be sustained through the formation of research centers that bring together researchers from host countries and student sending countries. Pornomariov & Boardman (2010) suggest that academics affiliated to centers collaborate more with industry, academics affiliated to the center, and have interdisciplinary collaborations owing to the composition of centers by institutions, academic disciplines, and affiliated companies. Doctoral students abroad would, therefore, need to be encouraged to gain affiliations with research centers in their countries or region as a mechanism for ensuring easy integration into ongoing research projects following their study completion and return. On the other hand, hosting institutions and countries would need to strengthen collaboration with regions, countries, institutions and research centers in student sending countries. Increasing collaboration would enable students abroad to maintain and strengthen access to the regional networks and prepare them for continued future research collaborations after graduation.

Increased international collaborations have a positive impact on publications and particularly for female faculty. Through conferences, it might be possible to maintain contacts among researchers. For student hosting countries and institutions, this could be a useful tool to sustain contacts among alumni and student mentors. Conferences are known to increase international collaborations (Kyvik & Larsen 1994) and are sources of scientific information (Haslett 2009). For institutions hosting international students, conferences would not only maintain contact with graduates but provides an informal forum for further mentoring. One

way of doing this is through organizing annual international conferences for alumni and making opportunities available for further research training for alumni at subsidized costs. Moreover, the existence of alumni relations offices would provide information channels for training and conferences. In short, they could provide some of the functional roles assumed by professional societies. Meanwhile, Uganda also might need to establish more research centers and provide funding to institutions in support of global research activity. Such funding would facilitate travel abroad for academic conferences, further training and publication costs. Without such contact, study abroad graduates might lead to a pile-up of negative perceptions about study abroad as they trail domestic graduates.

### ***Implications related to study abroad factors***

The study identifies several implications for Uganda's policy makers, academic institutions, and funders well aware of the diverse influences of each of the factors. There is a need to reflect carefully on the outcomes of study abroad factors in the process of decision making especially; when selecting a study abroad destination, deciding on the duration of study program abroad, the intensity of the experience and parameters for the selection of study abroad participants.

More developed destinations improve the potential for global engagement. While the outcomes suggest that the more developed destinations offer better results in global engagement, it would appear reasonable for students to target more developed countries for study abroad destination. However, in selecting more developed destinations, it might be prudent to consider geographical distance for

purposes of future collaboration and maintenance of contact. Therefore, in situations where the only considerations are about the level of development and geographical distance of a destination, more developed and nearer destinations are better for study abroad. Nearby destinations also enable students to maintain contact with ongoing research projects in their countries of origin and be able to link with other researchers before study completion and eventual return.

Cognizant of the result that the more intense the study abroad experience, the better the outcomes for higher education research. Therefore, it makes sense to provide students with more intense experiences. It might include; studying in English speaking countries, getting an internship and work experience abroad, having more than one study destination abroad, studying abroad before Ph.D. and sending students to a common destination. Aware that internships and work experience for students on doctoral study abroad in many countries and courses, it is imperative that Uganda government make bilateral for internships opportunities for doctoral students in destination countries. Through bilateral agreements, internships could be made a mandatory component of doctoral training for countries hosting students. Where host countries make no such arrangements, the sending country could negotiate and or outsource internships for doctoral students in countries willing to render such services. It could be undertaken under bilateral trade agreements with another country or negotiated with academic institutions. After all, the General Agreement on Trade in Services (GATS) covers education under tradeable services. Research Internships made available in already existing multinational, international or national projects either

within the host country or projects created and run in conjunction with the student sending country would provide valuable experience. In this way, students get the opportunity of gaining a more participatory hands on experience under the mentorship of research experts within the discipline and become linked to international researcher networks. It could also provide students with practical research experiences abroad before they complete their doctoral study and return.

When technological gaps exist for returnees from more developed countries especially for faculty in the hard disciplines needs to address for study abroad to contribute towards a competitive research faculty. Training must be need driven and accompanied by corresponding technological investments in higher education. Training that is not backed by technological investment would lead to a redundant pool of researchers and a waste of human resource. Such academics could easily get lured into other private but more profitable research that does not require advanced technologies and participates less in basic research. Managing the cost of technological investments for resources constrained economies is also a challenge. Therefore, a potential alternative rests in specialization in a few fields with a competitive advantage and have adequate research infrastructure in place rather than covering many areas and conduct mediocre research due to inadequate facilities for research.

Demographic factors are important in providing answers on who on who would contribute to maximum benefits and mechanisms of attaining quantifiable outcomes in global engagement. In as far as age is concerned, the hard disciplines require much younger faculty able to cope with technological changes. They need

to undertake doctoral study abroad at a much younger age compared to students in the humanities. Enrolments abroad at a young age would allow faculty in the hard disciplines a longer span of experience before aging out of tenured faculty jobs. On the other hand, faculty in the soft disciplines would contribute more as they become more experienced and therefore could serve for more years compared to those in hard disciplines. By varying faculty age by academic discipline, Ugandan institutions would be able to maximize global outcomes in research.

In the gender category, males have greater chances for global engagement compared to females. However, female faculty equally perform well when given opportunities for international collaboration. Females tend to publish more when their international collaborations are high. Therefore, it is imperative for domestic as well as host institutions to cultivate an environment for continued collaboration of returnees. Females also need encouragement on affiliation to international societies. Female faculty who had a more intense study abroad also had low international affiliations and access to international funding. Furthermore, given the differences in gender outcomes, the study finds credence in the idea of variations in productivity between males and females. Given the differences, the study suggests assessments of changes in productivity on the basis of programs could be better done by comparing members of the same sex.

***Implications of durability of study abroad outcomes in research***



Finally, study abroad outcomes declined for older cohorts compared to more recent returnees. The loss of contacts who are crucial assets for continued engagement abroad could partly explain the decrease in outcomes. Considering that the advantages of studying abroad fade with time, perhaps there is a need for continued renewal especially after every five to ten years. The remedy for continued revitalization through mechanisms that might include among others; a postdoc study abroad. Many alternative ways of dealing with emerging challenges and variations might exist depending on academic disciplines, gender, academic rank and education level. The options could take different forms including postdoc experience abroad, sabbatical leave, and short-term research training courses abroad and sponsor joint research projects abroad with other institutions. Above all maintaining contact with international communities of researchers through stronger inter-university and bilateral research collaborations would ensure long lasting contacts among faculty even years following doctoral graduation.

### ***Implications for researchers***

In the past, CV analysis methods applied in studies were mainly cross sectional. The cross sectional form of CV analysis could face related constraints of missing data and unable to compare the rate of change across time. The current study explored and proposed the use of CV as longitudinal data. It reveals the capacity of LCVA to deal with missing data that would otherwise potentially be deleted in regression analysis techniques for cross sectional data and with the consequence of reduction in sample size. Therefore, in a circumstance where the potential to obtain data complete is limited for some reasons, it would be more appropriate to

use LCVA method. However, it would also be prudent to be aware of possible limitations that might affect the application of the method.

### **9.7. Limitations of LCVA method**

LCVA method had benefits and challenges. Like many other document methods, the strength of the LCVA method was found suitable for utilizing enduring records with the potential of being analyzed more than once hence allowing the researcher the opportunity to cross check potential coding errors and redo the work when needed. Secondly, it was possible to use records without contacting the owners and even those who would be unavailable had their records accessed. Thirdly, the LCVA makes it possible to code data in a longitudinal format for whenever tracing of dates is made possible. The data format of LCVA gives it the capacity to deal with challenges missing values often common to cross-sectional data. Despite the advantages, there were also many difficulties, especially in the coding process.

CVs are not standardized as to meet requirements of the study because they are not designed for study purposes. There was data variation characterized by silences even for dates in some of the CVs. It might be difficult to ascertain whether the silences means a missing value or a zero count. The silence in a CV presented a challenge in coding and rules had to be laid down for consistency on what is to be recorded as a zero or missing value. Decisions need to be taken and rules established so as to maintain high inter-coder reliability.

Noted was also that, devising a coding manual is one thing, but subsequent interpretations in the process of application are another one. Coding manuals

usually require interpretation of the data and interpretations need further specification in the coding process. The same is true for even cross sectional CV analysis method. In some cases, the researcher had to draw from personal knowledge of the research context or check on internet resources to make an informed decision. In filtering CVs, some CVs had no nationality records and therefore making it difficult to decide whether to include or exclude. On the other hand, difficulties also arise in deciding on citizenship. It also came from decisions regarding the national identities of collaborators in research. One way of dealing with this difficulty was to use the name as an identifier for nationality and sometimes relying on knowledge of the specific person and tracing the individual and affiliation in the net. However, it could also mislead because people change citizenship, and this may not be known to the researcher.

Among others, another major challenge was the difficulty in coding research engagement dimensions. It was problematic to make a clear decision about the internationality of a journal especially for less familiar journal without full knowledge of national journals. The same was with some of the affiliations. Interpretations are often prone to being subjective and can lead to error. Internet check was inevitable. Moreover, data from CVs were only as good as provided. The study made no assumptions about intent for missing data in CV documents, and coding rules strictly followed.

Arising from the measurement side, was the link between the number of affiliations to international affiliation to professional bodies and its implications on the actual number of engagements or activities in each society. Measurement was based on

the number of affiliations held per year. However, holding an affiliation says little about the level of activity. In principle, it might be assumed that the more affiliated faculty would be more active globally. Such an assumption is blind to the fact that faculty with fewer affiliations could equally or even be more engaged than those with more affiliations. The weakness is accepted on the basis that it is reasonable to assume that more affiliations would imply the likelihood of more activity and moreover, CV data rarely provides detailed activities performed for a professional society during a specific year compared to other outcome dimensions.

Finally, CVs are submitted at different dates and therefore presenting challenges of missing data. As a result, some of them were obsolete for the purpose because they did not have records of required data (2009-2014). Others are submitted more recently and also do not have some of the data because the individuals joined higher education faculty recently. Therefore their data is limited to the period of faculty tenure. The challenges had implications on missing data. To accommodate the problem, a longitudinal format of data capture was adopted and which also allow for more robust analytical techniques that easily overcomes challenges of missing values. The was turned from a weakness into a strength of the LCVA analysis. However, it is also based on the assumption that all experiences are dated for purposes of accuracy. In the absence of dates, standardized methods were used to compute required dates.

### **9.8. Study limitations and recommendations**

The study had some limitations. The most important being the inequalities associated with the Uganda higher education research context which could undermine comparability of outcomes and others linked with the small sample size, selection bias and generalizability. The study limitations are discussed one at a time.

The study acknowledges the existence of inequalities even at the national level. Therefore, an alternative interpretation of the study outcomes would consider the role of contextual inequalities in the Uganda higher education context. These would constitute the random effects problem. Such influences could arise from factors already mentioned including; donor funding bias in higher education, availability of research equipment, salary variations, large numbers of students in higher education amidst small numbers of faculty, the core priorities of the specific universities, and budgetary constraints among the different institutions especially private universities. Fortunately, the study anticipated the influence of random variables on the outcomes and had an influence on the choice of GEE for statistical analysis. In mitigating for the influence of random effects, GEE method as a marginal model, ensures that the results of the analysis are non-dependent on any random factors or prior scores (Gibbons, Hedeker, & DuToit, 2010). Through the approach the effects factors that were not of specific interest to the study are statistically overcome and therefore assumed to be free from such influences.

Considering the number of sample analyses conducted amidst a limited sample size 170 CVs (N=795), the study was bound to face challenges of statistical power. To check whether the non-significant results were due to a lack of statistical power, a post hoc power analyses using PASS 14 conducted with power ( $1 - \beta$ ) set at 0.80 and  $\alpha = 05$ , two-tailed. The baseline analyses for question 5 and question 6 comparing domestic and foreign doctorates on global engagement had more than enough power to detect effects as low as 0.23 (Table 9.1). However, some of the secondary analyses in the sub samples could have lacked adequate power to detect some the effects. A minimum power equal or above 0.80 is often recommended (Cohen, 1992). Others suggest a 0.2 as the lowest, 0.5 as the medium and 0.80 is the highest level (Robson & McCartan, 2016). The 0.80 power size was adopted with  $\alpha = 0.01$  and 0.05 for a two tailed test, the study would only be able to detect effects sizes corresponding or above detectable effects as shown in the Table 9.1. It is evident that Postdoc and female categories would need larger samples to have sufficient power to detect effects of less than 0.92 and 0.66 respectively. In the early and mid-careers, only effects of 0.50 and above would detected. The remaining sample categories had enough power to detect effects varying between 0.25 and 0.44. It is, therefore, likely that some of the negative findings for the study abroad effects could be below detectable levels and could have been missed due to insufficient effect size.

Table 9.1: Statistical power analysis table

Sample Category	Power	Minimum detectable value ( $p < 0.05$ )	Foreign	Domestic
Baseline	0.80	0.26	705	215
Ph.D.	0.80	0.29	623	186
Postdoc	0.80	0.92	82	28
Male	0.80	0.30	543	170
Female	0.80	0.66	162	44
Professor	0.80	0.45	251	86
Lecturer	0.80	0.35	454	128
Hard disciplines	0.80	0.47	341	74
Soft disciplines	0.80	0.35	364	140
Early-Career	0.80	0.57	131	65
Mid-Career	0.80	0.46	316	78
Advanced-Career	0.80	0.51	258	66

The second concern was that the possibility of selection bias. The problem of selection bias was envisaged at the beginning of the study. There is no empirical evidence to suggest selection bias. However, the study makes caution on the basis that it is reasonable to expect selection bias in a non-controlled study context. Bias could arise from study abroad participant selection, the non-random sample based on available data and self-reported CV information. Selection bias could result from a biased selection of participants. Scholarship providers could have their selection criteria. Participant selection at University level in circumstances where candidates are already tenured faculty could also affect the choice of participants. Individual motivations could also have an influence on those choosing to study abroad. Still, at the individual level, selection bias could arise from the selection of information included in the CVs under study. In circumstances where there is no CV template, the tendency to exaggerate performances and to downplay some of the useful information could lead to variations and measurement error. However, there is no way to demonstrate such error.

The third concern is a comment on generalizability. This data was drawn from a specific context of a small low-income Anglophone country with a higher education system still under development amidst scarce resources and with limited domestic research funding. It would, therefore, be inappropriate to attempt to generalize the findings without taking into considerations differences in settings. Even among countries listed as low-income countries, some are francophone countries and inherited a different education system and could greatly constrain extrapolation of the study outcomes. At best, the study may provide a picture for countries with similar backgrounds and even more important is a template for evaluation of their study abroad outcomes. It would also be more appropriate for such countries and even individual institutions to consider developing an evaluative system for their higher education faculty and develop an information system for decision making.

Fourth, the study employed statistical control rather than experimental control. Potential contamination of the comparison group was of great concern because study abroad graduates interact with home graduates and in most cases turn out to be tutors and supervisors of research students who rise to become professors within the same higher education system. In many respects, they collaborate in research and have joint publications. The threat of contamination was found to be inescapable and bound to affect studies of study abroad outcomes in research. However, contamination would not entirely erase the potential differences in outcomes. While members of the control group may gain knowledge from study abroad alumni and even collaborate in research, they do not necessarily gain



access to the social capital associated with study abroad. Besides, it is unlikely that experimental control would be possible in studies of this kind.

Finally, studies of global engagement outcomes following study abroad are only emerging. Considering professional diversity, it is still a potent area for more study. As the world's citizens move towards becoming a global village, concerns over the competitiveness of systems of every country becomes a question of survival through professional development. Globally competitive citizens may not only be a concern for low-income countries but even for higher income countries that could easily be edged out by stronger rival countries. Therefore, it might be of interest that nations consider extending evaluations of the competitive advantages brought by the study abroad experience for its nationals to other professional fields and where appropriate, to consider bilateral agreements on training in specific fields including; curriculum, administration and teaching.

## **9.9. Conclusions**

This study recognizes the differences in terms of research capacity for different countries and which could also affect graduate research outcomes. It is also cognizant of the low capacity especially in Sub Saharan Africa compared to other global regions with higher capacity whose faculty might even consider no need for study abroad. Although it draws literature from other regions to illuminate the results of the current study, it makes no attempt to compare with faculty from other regions or countries as this is beyond the scope of the current study.

This particular study which was conducted using LCVA method involving a sample of 170 CVs drawn from the archives of the National Council of Higher Education of Uganda could have had even more impactful results had it benefitted from a larger sample. This was a small sample compared to most studies that have used the CV analysis method. It might be useful to think that, had a large sample been realized a number of the positive outcomes in some dimensions would have been significant. Nevertheless there were positive lessons to be drawn from it.

Study abroad for global engagement is an impactful experience for higher education faculty in the overall research involvement. The outcomes are realized especially among male faculty in the soft disciplines who appear to benefit more than females. This variation was explained by disciplinary differences and gender roles respectively and therefore requiring caution in making conclusive judgments regarding study abroad outcomes.

Study abroad outcomes vary by dimension and under the influence of diverse factors. The most prominent outcomes are in the funding and affiliation dimensions. While positive differences in favor of study abroad were noted in most of the dimensions, they were not significantly large. The variations within dimensions were largely affected by gender, academic discipline, education level and academic rank of faculty among other factors. Evaluations of global engagement outcomes of study abroad need to consider the diverse categories of research engagement.

Study abroad factors were associated with changes in global engagement in research and at times particular dimensions may differ in patterns compared to the overall study abroad outcome. Each of the factors had specific outcomes in specific dimensions. In general however, longer durations, and greater depth in study abroad offered opportunity of increased performance. Destinations in highly developed countries had limitations in affiliations and conferences that could be attributable prohibitive visa regimes and travel costs.

Although study abroad has positive outcomes, the benefits appear to last no more than a five-year period. Groups of academics with more than five years following Ph.D. were no different from domestic doctorates and could even deteriorate further after ten years of graduation. Training institutions and student hosting countries might consider making continuous follow up on the performance of their graduates at a global level. Remedial mechanisms could be designed to address a shortcoming in training.

The dimensions of research were found to be correlated among themselves. Not surprising because they measure the same construct. This means that performance in one dimension would have implications for performance on another. To determine the specific outcome on each of them required analysis that adjusts for the influence of others. Therefore, a feature of global engagement in research is such that, a complete analysis of outcomes needs to take into account the implications of all the dimensions of research on outcomes.

## References:

- Abramo, G., D'Angelo, C. A., & Di Costa, F. (2009). Research collaboration and productivity: Is there a correlation? *Higher Education*, 57(2), 155–171.
- Adnett, N. (2010). The growth of international students and economic development: friends or foes? *Journal of Education Policy*, 25(5), 625–637.
- Adriana Medina–López–Portillo. (2003). Intercultural Learning Assessment : The Link between Program Duration and the Development of Intercultural Sensitivity, (1979), 179–200.
- Altbach, P., E. Reisberg, and L. Rumbley. 2009. Trends in global higher education: Tracking an academic revolution. Paris: UNESCO
- Ansmann, L., Flickinger, T. E., Barello, S., Kunneman, M., Mantwill, S., Quilligan, S., Aelbrecht, K. (2014). Patient Education and Counseling Career development for early career academics : Benefits of networking and the role of professional societies. *Patient Education and Counseling*, 97(1), 132–134.
- Auranen, O., & Nieminen, M. (2010). University research funding and publication performance-An international comparison. *Research Policy*, 39(6), 822–834.
- Babbie, E (2007), *The Practice of Social Research*, (11<sup>th</sup> edition), Belmont, CA: Wadsworth.
- Bartram, B. (2007). The Sociocultural Needs of International Students in Higher Education: A Comparison of Staff and Student Views. *Journal of Studies in International Education*, 11(2), 205–214.
- Beckmann, K., Schneider, A., & Schneider, K. B., and A. (2013). The interaction of publications and appointments: new evidence on academic economists in Germany. *Education Economics*, 21(4), 415–430.
- Beine, M., Docquier, F., & Rapoport, H. (2008). Brain Drain and Human Capital Formation in Developing Countries: Winners and Losers. *Economic Journal*, 118(528), 1–27.
- Bender, C, Wright, D, & Lopatto, D. (2009). Students' self-reported changes in intercultural knowledge and competence associated with three undergraduate science experiences. *Frontiers: The Interdisciplinary Journal of Study Abroad*, 18, 307-321.
- Bird, S. K. (2011). Do women publish fewer journal articles than men? Sex differences in publication productivity in the social sciences. *British Journal of Sociology of Education*, 32(6), 921–937

- Bozeman, B., & Corley, E. (2004). Scientists' collaboration strategies: implications for scientific and technical human capital. *Research Policy*, 33(4), 599–616.
- Brooks, R., & Waters, J. (2009). A second chance at 'success' UK students and global circuits of higher education. *Sociology*, 43(6), 1085-1102.
- Bryman, A. (2015). *Social research methods*. Oxford university press.
- Buela-Casal, G., Perakakis, P., Taylor, M., & Checa, P. (2006). Measuring internationality: Reflections and perspectives on academic journals. *Scientometrics*, 67(1), 45–65.
- Buela-Casal, G., & Zych, I. (2012). How to measure the internationality of scientific publications. *Psicothema*, 24(3), 435-441.
- Byers, A. L., Allore, H., Gill, T. M., & Peduzzi, P. N. (2003). Application of negative binomial modeling for discrete outcomes: a case study in aging research. *Journal of clinical epidemiology*, 56(6), 559-564.
- Cañibano, C., Otamendi, J., & Andújar, I. (2008). Measuring and assessing researcher mobility from CV analysis: the case of the Ramón y Cajal programme in Spain. *Research Evaluation*, 17(1), 17–31.
- Carlson, J. S. (1991). *Study Abroad: The Experience of American Undergraduates in Western Europe and the United States. Occasional Papers on International Educational Exchange Research Series*. Publications Department, Council on International Educational Exchange, 205 East 42nd Street, New York, NY 10017.
- Chudnovsky, D., López, A., Rossi, M. A., & Ubfal, D. (2008). *Money for Science? The Impact of Research Grants in Argentina* (Vol. 224). IDB working paper series.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155–159.
- Cohen L. Manion, L. & Morrison, K (2011). *Research Methods in Education* (Seventh edition), London, Routledge.
- Coleman, J. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94(1988).
- Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis for field setting*. MA: Houghton Mifflin.

- Cubillos, J. H., Chieffo, L., & Fan, C. (2008). The Impact of Short-Term Study Abroad Programs on L2 Listening Comprehension Skills. *Foreign Language Annals*, 41(1), 157–186.
- Cui, J. (2007). QIC program and model selection in GEE analyses. *Stata journal*, 7(2), 209.
- Deardorff, D. K. (2006). Identification and Assessment of Intercultural Competence as a Student Outcome of Internationalization. *Journal of Studies in International Education*, 10(3), 241–266.
- Diamond Jr, A. M., & Haurin, D. R. (1994). Determinants among PhD economists of membership in a professional association. *Education Economics*, 2(1), 13-28.
- Dietz, J. S., & Bozeman, B. (2005). Academic careers, patents, and productivity: industry experience as scientific and technical human capital. *Research Policy*, 34(3), 349–367.
- Dimitrios, N. K., Sakas, D. P., & Vlachos, D. S. (2014). Modeling the Scientific Dimension of Academic Conferences. *Procedia - Social and Behavioral Sciences*, 147, 576–585.
- Dowling, P.C., Brown, A.J. (2010), '*Doing Research/Reading Research: Re-interrogating education*. (2<sup>nd</sup> edition). London. Routledge.
- Doyle, D. (2009). Holistic Assessment and the Study Abroad Experience. *Frontiers: The Interdisciplinary Journal of Study Abroad*, 18, 143-155.
- Drexler, D. S., & Campbell, D. F. (2011). Student Development among Community College Participants in Study Abroad Programs. *Community College Journal of Research and Practice*, 35(8), 608–619.
- Dunne, C. (2009). Host Students' Perspectives of Intercultural Contact in an Irish University. *Journal of Studies in International Education*, 13(2), 222–239.
- Dwyer, M. (2004). More Is Better: The Impact of Study Abroad Program Duration. *Frontiers: The Interdisciplinary Journal of Study Abroad*, 151–164.
- Engel, C. (2010). The impact of Erasmus mobility on the professional career: Empirical results of international studies on temporary student and teaching staff mobility. *Belgeo. Revue belge de géographie*, (4), 351-363.
- Engle L; Engle J. (2003). Assessing Language Acquisition and Intercultural Sensitivity Development in Relation to Study Abroad Program Design. *The Interdisciplinary Journal of Study Abroad Cultural*, 1(20), 219–236.

- Fox, M. F. (2005). Gender, Family Characteristics, and Publication Productivity among Scientists. *Social Studies of Science*, 35(February), 131–150.
- Franklin, K. (2010). Long-term career impact and professional applicability of the study abroad experience. *Frontiers: The interdisciplinary journal of study abroad*, 19, 169-190.
- Fuller, T. L. (2007). Study Abroad Experiences and Intercultural Sensitivity Among Graduate Theological Students: A Preliminary and Exploratory Investigation. *Christian Higher Education*, 6(4), 321–332.
- García, R., Gómez, D., Parra, D., Trattner, C., Kaltenbrunner, A., & Graells-Garrido, E. (2015). Language, Twitter and Academic Conferences. *arXiv preprint arXiv:1504.03374*.
- Gaughan, M., & Bozeman, B. (2002). Using curriculum vitae to compare some impacts of NSF research grants with research center funding. *Research Evaluation*, 11(1), 17-26.
- Gibbons, R. D., Hedeker, D., & DuToit, S. (2010). Advances in analysis of longitudinal data. *Annual review of clinical psychology*, 6, 79-107.
- Gingras, Y., Larivière, V., Macaluso, B., & Robitaille, J. P. (2008). The effects of aging on researchers' publication and citation patterns. *PLoS ONE*, 3(12).
- Good, B. (2005). The benefits of professional association membership. *Orange County Business Journal*, 28(34), 1.
- Gulbrandsen, M., & Smeby, J. C. (2005). Industry funding and university professors' research performance. *Research Policy*, 34(6), 932–950.
- Hadis \*, B. F. (2005). Gauging the impact of study abroad: how to overcome the limitations of a single-cell design. *Assessment & Evaluation in Higher Education*, 30(1), 3–19.
- Hanson, C. S., Schneider, D., & Hill, A. M. (2008). Seed grants as a means of stimulating cancer research funding. *Health Policy*, 88(2-3), 243–249.
- Haslett, S. K. (2009). Higher education conference attendance and engagement with the scholarship of teaching and learning: a Welsh perspective null. *Journal of Applied Research in Higher Education*, 1(2), 66–73.
- Hicks, D. (2012). Performance-based university research funding systems. *Research Policy*, 41(2), 251–261.

- Hoekman, J., Scherngell, T., Frenken, K., & Tijssen, R. (2012). Acquisition of European research funds and its effect on international scientific collaboration. *Journal of Economic Geography*, 12(1), 1-11.
- Holliday, E. B., Jaggi, R., Wilson, L. D., Choi, M., Thomas, C. R. J., & Fuller, C. D. (2014). Gender differences in publication productivity, academic position, career duration, and funding among U.S. academic radiation oncology faculty. *Academic Medicine*, 89(5), 767–773.
- Houser, C., Brannstrom, C., Quiring, S. M., & Lemmons, K. K. (2011). Study Abroad Field Trip Improves Test Performance through Engagement and New Social Networks. *Journal of Geography in Higher Education*, 35(4), 513–528.
- Ioannidou, E., & Rosania, A. (2015). Under-representation of women on dental journal editorial boards. *PloS one*, 10(1), e0116630.
- Ismail, B., Morgan, M., & Hayes, K. (2006). Effect of short study abroad course on student openness to diversity. *Journal of Food Science Education*, 5(1), 15-18.
- Janssen, S. J., Bredenoord, A. L., Dhert, W., de Kleuver, M., Oner, F. C., & Verlaan, J. J. (2015). Potential conflicts of interest of editorial board members from five leading spine journals. *PloS one*, 10(6), e0127362..
- Jonkers, K., & Tijssen, R. (2008). Chinese researchers returning home: Impacts of international mobility on research collaboration and scientific productivity. *Scientometrics*, 77(2), 309-333.
- Katz, J. S., & Martin, B. R. (1997). What is research collaboration? *Research policy*, 26(1), 1-18.
- Katz, J. S., & Hicks, D. (1997). How much is a collaboration worth? A calibrated bibliometric model. *Scientometrics*, 40(3), 541–554.
- Knight, J. (2002). Trade in higher education services: The implications of GATS. *The Observatory on borderless higher education*, 3, 2002.
- Kyvik, S. (2003). Changing trends in publishing behaviour among university faculty, 1980-2000. *Scientometrics*, 58(1), 35-48.
- Kyvik, S., & Larsen, I. M. (1994). International contact and research performance. *Scientometrics*, 29(1), 161–172.
- Kyvik, S. (1990). Age and scientific productivity. Differences between fields of learning. *Higher Education*, 19(1), 37-55.



- Kyvik, S., & Aksnes, D. W. (2015). Explaining the increase in publication productivity among academic staff: a generational perspective. *Studies in Higher Education, 40*(8), 1438–1453.
- Kyvik, S., & Olsen, T. B. (2008). Does the aging of tenured academic staff affect the research performance of universities? *Scientometrics, 76*(3), 439–455.
- Kyvik, S., & Smeby, J. C. (1994). Teaching and research. The relationship between the supervision of graduate students and faculty research performance. *Higher Education, 28*(2), 227-239.
- Larivière, V., Vignola-Gagné, E., Villeneuve, C., Gélinas, P., & Gingras, Y. (2011). Sex differences in research funding, productivity and impact: An analysis of Québec university professors. *Scientometrics, 87*(3), 483–498.
- Larsen, K., & Vincent-lancrin, S. (n.d.). International Trade in Educational Services : Good or Bad ? *14*(3).
- Lee, J. J. (2010). International students' experiences and attitudes at a US host institution: Self-reports and future recommendations. *Journal of Research in International Education, 9*(1), 66–84.
- Lee, S. (2005). The Impact of Research Collaboration on Scientific Productivity. *Social Studies of Science, 35*(5), 673–702.
- Lee, S., & Bozeman, B. (2005). The impact of research collaboration on scientific productivity. *Social studies of science, 35*(5), 673-702.
- Lepori, B., & Probst, C. (2009). Using curricula vitae for mapping scientific fields: a small-scale experience for Swiss communication sciences. *Research Evaluation, 18*(2), 125–134.
- Liang, K. Y., & Zeger, S. L. (1986). Longitudinal data analysis using generalized linear models. *Biometrika, 13*-22.
- Lin, M.-W., & Bozeman, B. (2006). Researchers' Industry Experience and Productivity in University–Industry Research Centers: A “Scientific and Technical Human Capital” Explanation. *The Journal of Technology Transfer, 31*(2), 269–290.
- Lisée, C., Larivière, V., & Archambault, É. (2008). Conference proceedings as a source of scientific information: A bibliometric analysis. *Journal of the American Society for Information Science and Technology, 59*(11), 1776-1784.

- Lola, M. (2005). Researcher mobility: Opportunities and challenges. *Career Paths and Mobility of Researchers in Europe*, 21.
- Luukkonen, T., Tijssen, R., Persson, O., & Sivertsen, G. (1993). The measurement of international scientific collaboration. *Scientometrics*, 28(1), 15-36.
- Luty, J., Arokiadass, S. M. R., Easow, J. M., & Anapreddy, J. R. (2009). Preferential publication of editorial board members in medical specialty journals. *Journal of Medical Ethics*, 35(3), 200-202.
- Ma, Y., Mazumdar, M., & Memtsoudis, S. G. (2012). Beyond Repeated measures ANOVA: advanced statistical methods for the analysis of longitudinal data in anesthesia research. *Regional anesthesia and pain medicine*, 37(1), 99.
- Mani, J., Makarević, J., Juengel, E., Ackermann, H., Nelson, K., Bartsch, G., & Blaheta, R. A. (2013). I Publish in I Edit?-Do Editorial Board Members of Urologic Journals Preferentially Publish Their Own Scientific Work? *PloS one*, 8(12), e83709.
- Marginson, S., & van der Wende, M. (2007). To Rank or To Be Ranked: The Impact of Global Rankings in Higher Education. *Journal of Studies in International Education*, 11(3-4), 306–329.
- Maringe, F., & Carter, S. (2007). International students' motivations for studying in UK HE: Insights into the choice and decision making of African students. *International Journal of Educational Management*, 21(6), 459–475.
- Markova, G., Ford, R. C., Dickson, D. R., & Bohn, T. M. (2013). Professional associations and members' benefits: what's in It for me? *Nonprofit Management and Leadership*, 23(4), 491-510.
- Mauleón, E., Hillán, L., Moreno, L., Gómez, I., & Bordons, M. (2013). Assessing gender balance among journal authors and editorial board members. *Scientometrics*, 95(1), 87-114.
- Moffatt, B. (2014). Research funding and authorship: does grant winning count towards authorship credit? *Journal of Medical Ethics*, 40(10), 683–686.
- Mohajeri Norris, E., & Gillespie, J. (2008). How Study Abroad Shapes Global Careers: Evidence From the United States. *Journal of Studies in International Education*, 13(3), 382–397.
- Morton, M. J., & Sonnad, S. S. (2007). Women on professional society and journal editorial boards. *Journal of the National Medical Association*, 99(7), 764.

- Murphy, D., Sahakyan, N., Yong-Yi, D., & Magnan, S. S. (2014). The Impact of Study Abroad on the Global Engagement of University Graduates. *Frontiers: The Interdisciplinary Journal of Study Abroad*, 24, 1-24.
- National Council of Higher Education (2010). *The state of higher education and training in Uganda 2010*.
- Norris, E. M., & Steinberg, M. (2008). Does Language Matter? The Impact of Language of Instruction on Study Abroad Outcomes. *Frontiers: The Interdisciplinary Journal of Study Abroad*, 17, 107-131.
- OECD (2017), OECD statistics database. Retrieved from <https://www.innovationpolicyplatform.org/content/statistics-ipp>. (Accessed on 6 April 2017).
- Olsen, T. B., Kyvik, S., & Hovdhaugen, E. (2005). The promotion to full professor-through competition or by individual competence? *Tertiary Education & Management*, 11(4), 299-316.
- Olson, J. E., & Lalley, K. (2012). Evaluating a Short-Term, First-Year Study Abroad Program for Business and Engineering Undergraduates: Understanding the Student Learning Experience. *Journal of Education for Business*, 87(6), 325–332.
- Oosterbeek, H., & Webbink, D. (2011). Does Studying Abroad Induce a Brain Drain? *Economica*, 78(310), 347–366.
- Orahood, T., Kruze, L., & Pearson, D. E. (2004). The impact of study abroad on business students' career goals. *Frontiers: The Interdisciplinary Journal of Study Abroad*, 10, 117-130.
- Orahood, T., Woolf, J., & Kruze, L. (2008). Study abroad and career paths of business students. *Frontiers: The Interdisciplinary Journal of Study Abroad*, 17, 133-141.
- Padilla-Gonzalez, L., Metcalfe, A. S., Galaz-Fontes, J. F., Fisher, D., & Snee, I. (2011). Gender Gaps in North American Research Productivity: Examining Faculty Publication Rates in Mexico, Canada, and the U.S. *Compare: A Journal of Comparative and International Education*, 41(5), 649–668.
- Paige, R. M., Fry, G. W., Stallman, E. M., Josić, J., & Jon, J. E. (2009). Study abroad for global engagement: the long-term impact of mobility experiences. *Intercultural Education*, 20, 29-44.
- Paige, R. M., Fry, G. W., Stallman, E., Jon, J.-E., & Josic, J. (2010). *Beyond Immediate Impact: Study Abroad for Global Engagement* (SAGE), xii-214.

Retrieved from <http://www.calstate.edu/engage/documents/study-abroad-for-global-engagement.pdf> (Last accessed on 30th March 2017).

- Pan, Y., & Zhang, J. Q. (2014). The composition of the editorial boards of general marketing journals. *Journal of Marketing Education*, 36(1), 33-44.
- Parker, M. R., Jordan, K. R., Kirk, E. R., Aspiranti, K. B., & Bain, S. K. (2010). Publications in Four Gifted Education Journals from 2001 to 2006: An Analysis of Article Types and Authorship Characteristics. *Roeper Review*, 32(3), 207–216.
- Ponomariov, B. L., & Boardman, P. C. (2010). Influencing scientists' collaboration and productivity patterns through new institutions: University research centers and scientific and technical human capital. *Research Policy*, 39(5), 613-624.
- Pravdić, N., & Oluić-Vuković, V. (1986). Dual approach to multiple authorship in the study of collaboration/scientific output relationship. *Scientometrics*, 10(5-6), 259-280.
- Poole, D. L., & Davis, T. S. (2006). Concept Mapping to Measure Outcomes in Study Abroad Programs<sup>1</sup>. *Social Work Education*, 25(1), 61–77.
- Raudenbush, S. W. (2001). Comparing personal trajectories and drawing causal inferences from longitudinal data. *Annual review of psychology*, 52(1), 501-525.
- Rexeisen, R. J., & Al-Khatib, J. (2009). Assurance of Learning and Study Abroad: A Case Study. *Journal of Teaching in International Business*, 20(3), 192–207.
- Rexeisen, R. J., Anderson, P. H., Lawton, L., & Hubbard, A. C. (2008). Study abroad and intercultural development: A longitudinal study. *Frontiers: The Interdisciplinary Journal of Study Abroad*, 17, 1-20.
- Robson, C., & McCartan, K. (2016). *Real world research*. John Wiley & Sons.
- Rørstad, K., & Aksnes, D. W. (2015). Publication rate expressed by age, gender and academic position – A large-scale analysis of Norwegian academic staff. *Journal of Informetrics*, 9(2), 317–333.
- Rösing, C. K., Junges, R., & Haas, A. N. (2014). Publication rates of editorial board members in oral health journals. *Brazilian oral research*, 28(1), 1-5.

- Rigg, L. S., McCarragher, S., & Krmeneć, A. (2012). Authorship, collaboration, and gender: fifteen years of publication productivity in selected geography journals. *The Professional Geographer*, 64(4), 491-502.
- Salisbury, M. H., An, B. P., & Pascarella, E. T. (2013). The effect of study abroad on intercultural competence among undergraduate college students. *Journal of Student Affairs Research and Practice*, 50(1), 1-20.
- Salisbury, M. H., Umbach, P. D., Paulsen, M. B., & Pascarella, E. T. (2008). Going Global: Understanding the Choice Process of the Intent to Study Abroad. *Research in Higher Education*, 50(2), 119–143.
- Sarantakos, S. (2012). *Social research*. Palgrave Macmillan.
- Sasaki, M. (2011). Effects of varying lengths of study-abroad experiences on Japanese EFL students' L2 writing ability and motivation: A longitudinal study. *Tesol Quarterly*, 45(1), 81–105.
- Savicki, V. (2011). Relationship of Foreign Language Proficiency to Study Abroad Outcomes and Inputs. *Frontiers: The Interdisciplinary Journal of Study Abroad*, 21, 63-85.
- Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Houghton, Mifflin and Company.
- Shaftel, J., Shaftel, T., & Ahluwalia, R. (2007). International Educational Experience and Intercultural Competence. *International Journal of Business & Economics*, 6(1), 25–34.
- Shin, J. C., & Kehm, B. M. (Eds.). (2012). *Institutionalization of world-class university in global competition* (Vol. 6). Springer Science & Business Media.
- Shin, J. C., Jung, J., Postiglione, G. A., & Azman, N. (2014). Research productivity of returnees from study abroad in Korea, Hong Kong, and Malaysia. *Minerva*, 52(4), 467-487.
- Smeby, J. C., & Trondal, J. (2005). Globalisation or Europeanisation? International contact among university staff. *Higher Education*, 49(4), 449–466.
- Sivertsen, G. (2010). A performance indicator based on complete data for the scientific publication output at research institutions. *ISSI newsletter*, 6(1), 22-28.

- Sutton, R. C., & Rubin, D. L. (2004). The GLOSSARI Project: Initial Findings from a System-Wide Research Initiative on Study Abroad Learning Outcomes. *Frontiers: The Interdisciplinary Journal of Study Abroad*, 10, 65-82.
- Teichler, U., & Janson, K. (2007). The Professional Value of Temporary Study in another European Country: Employment and Work of Former ERASMUS Students. *Journal of Studies in International Education*, 11(3-4), 486-495.
- Tolmie A., Muijs D., McAteer (2011) Quantitative Methods in educational and social research Using SPSS, Open University Press, England.
- Trondal, J., Gornitzka, Å. & Gulbrandsen, M. (2003). Conceptual lenses. *Internationalisation of research and higher education. Emerging patterns of transformation*. Å. Gornitzka, M. Gulbrandsen and J. Trondal. Oslo, NIFU-report, 2, 2003.
- Twombly, S. B., Salisbury, M. H., Tumanut, S. D., & Klute, P. (2012). *Study Abroad in a New Global Century: Renewing the promise, refining the purpose, ASHE higher education report*. John Wiley & Sons.
- Ubfal, D., & Maffioli, A. (2011). The impact of funding on research collaboration: Evidence from a developing country. *Research Policy*, 40(9), 1269-1279.
- Van Rijnsoever, F. J., & Hessels, L. K. (2011). Factors associated with disciplinary and interdisciplinary research collaboration. *Research Policy*, 40(3), 463-472.
- Verbik, L., & Lasanowski, V. (2007). International student mobility: Patterns and trends. *World Education News and Reviews*, 20(10), 1-16.
- Wagner, A., & Schnitzer, K. (2014). Programmes and Policies for Foreign Students and Study Abroad : The Search for Effective Approaches in a New Global Setting and policies for international students and study abroad : the Programmes in a new global setting \* search for effective approaches, 21(3), 275-288.
- Wen, X., Lin, Y. R., Trattner, C., & Parra, D. (2014). Twitter in academic conferences: Usage, networking and participation over time. In *Proceedings of the 25th ACM conference on Hypertext and social media* (pp. 285-290). ACM.
- Weidner, E. W. (1966). The professor abroad: Twenty years of change. *The ANNALS of the American Academy of Political and Social Science*, 368(1), 60-70.

- Wendt, K., Slipersæter, S., & Aksnes, D. W. (2003). Internationalisation of research. *Internationalization of Research and Higher Education: emerging patterns of transformation*, 55-85.
- Wiers-Jenssen, J. (2007). Does Higher Education Attained Abroad Lead to International Jobs? *Journal of Studies in International Education*, 12(2), 101–130.
- Wiers-Jenssen, J. (2011). Background and Employability of Mobile vs. Non-Mobile Students. *Tertiary Education and Management*, 17(2), 79–100.
- Wiers-Jenssen, J., & Try, S. (2005). Labour market outcomes of higher education undertaken abroad. *Studies in Higher Education*, 30(6), 681–705.
- Wight, D. (2008). Most of our social scientists are not institution based... they are there for hire-Research consultancies and social science capacity for health research in East Africa. *Social Science and Medicine*, 66(1), 110–116.
- Wight, D., Ahikire, J., & Kwesiga, J. C. (2014). Consultancy research as a barrier to strengthening social science research capacity in Uganda. *Social Science and Medicine*, 116, 32–40.
- Williams, T. R. (2005). Exploring the Impact of Study Abroad on Students' Intercultural Communication Skills: Adaptability and Sensitivity. *Journal of Studies in International Education*, 9(4), 356–371.
- Wislar, J. S., Flanagan, a., Fontanarosa, P. B., & DeAngelis, C. D. (2011). Honorary and ghost authorship in high impact biomedical journals: a cross sectional survey. *Bmj*, 343(1), 128–128.
- Woolley, R., & Turpin, T. (2007, June). CV analysis as a complementary methodological approach: toward a deeper investigation of the mobility of scientists in the Asia-Pacific. In *Workshop on Methodological Issues in Using Curriculum Vitae for Research Evaluation and Science Policy Analysis. ISSI. Madrid* (Vol. 28).
- World Bank (2017), World Bank database, <http://data.worldbank.org/indicator>. Last accessed on 6 March 2017.
- Yang, K., & Lee, J. (2012). Analysis of publication patterns in Korean library and information science research. *Scientometrics*, 93(2), 233–251.
- Yeager, S. J., & Kline, M. (1983). Professional association membership of nurses: Factors affecting membership and the decision to join an association. *Research in nursing & health*, 6(2), 45-52.

- Ynalvez, M. A., & Shrum, W. M. (2011). Professional networks, scientific collaboration, and publication productivity in resource-constrained research institutions in a developing country. *Research Policy*, 40(2), 204–216.
- Zaninotto, P., & Falaschetti, E. (2011). Comparison of methods for modelling a count outcome with excess zeros: application to Activities of Daily Living (ADL-s). *Journal of epidemiology and community health*, 65(3), 205-210.
- Zhang, X., Liang, Y., Yu, Z., & Zhang, D. (2011). Understanding review activity in academic conferences. In *Signal Processing, Communications and Computing (ICSPCC), 2011 IEEE International Conference on* (pp. 1-4). IEEE.
- Zorn, C. R. (1996). The long-term impact on nursing students of participating in international education. *Journal of Professional Nursing*, 12(2), 106–110.



## Appendices

### Appendix 1: The Coding Manual

S/N	Variable	Data coding details
1	Age	Age was computed from date of birth up to 2014. Where age was missing in the CV, it was computed using available information on the year of completion of first degree. (2014-X) 23 (X is the completion year of first degree, 23 years are added for a three year course and 25 for a five year course in Uganda).
2	Gender	Male or Female as indicated in the CV. Whenever gender was not indicated in the CV, the names were used to impute gender. Others were known to the researcher.
3	Academic rank	There were four academic ranks with Ph.D. Lecturers, Senior Lecturers, Associate Professors and Professors. These were extracted as indicated in the CV.
4	Education level	Faculty education attainment had two levels only. Ph.D. and Postdoc as indicated in the CV. Where no postdoc is indicated, the implicit assumption was PhD
5	Experience	The number of years following completion of Ph.D. This was deduced from the difference between the year of graduation and 2014.
6	Academic discipline	The academic discipline as indicated in the CV. These were later merged into hard/soft disciplines during the analysis. Science related disciplines were labelled hard. Humanities and Social sciences were labelled soft disciplines.
7	Depth	Depth had six indicators and each had a score=1. A score of 06 means the highest intensity experience and zero means the lowest intensity (no such experience abroad). Scores indicators were: 1) studied abroad for PhD 2) studied in more than one destination 3) had work, internship, or field research experience abroad 4) English speaking destination for PhD 5) PhD in common destination 6) studied abroad prior to PhD.
8	Duration	The number of years spent studying abroad and includes the period for all courses done abroad.
9	Destination	The name of country stated on CV and then linking it to the Human Development Index (HDI) for that country as per the World statistics.
10	International publications	Number of publications in international journals per year. The publisher of the journal or book must have an address outside Uganda.
11	International collaboration	Number of publications with international academics per year. The international is a non-national. When no information on affiliation is available, the name was used and sometimes supported by an internet search.
12	International affiliations	Number of affiliations per year with societies with addresses based in other countries
13	International funding	Number of times accessed funding for research activity per year. Funding body has head offices based in another a country other than Uganda.
14	International projects	Number of projects involving more than one country or in another country per year.
15	International Conferences	Number of conference presentations outside national borders per year

## Appendix 2: The Coding Schedule

	Study Abroad Experience indicators										Annual Indicators of Research engagements					
	Demographics						Destination		Depth	Duration	Pub /year	Coll /year	Conf /year	Fund /year	Aff /year	Proj /year
	Gender	Exp	Age	Lev	App	Disc	Country	HDI	Total value	years						
1																
2																
3																

### Demographic dimension indicators

Gender	Male or female
Age	Age of the academic
Lev	Highest qualification (doctorate, post doctorate)
App	Highest appointment attained
Exp	Experience (number of years as an Academic)
Disc	Academic discipline (humanities or Science)

### Study Abroad dimension indicators

Destination	Destination indicators (Human Development Index of destination country)
Duration:	Duration indicators (years abroad).
Depth	Type of study abroad experience [1) studied abroad for PhD 2) studied in more than one destination 3) had work, internship, or field research experience abroad 4) English speaking destination for PhD 5) PhD in common destination 6) studied abroad prior to PhD]

### Global Research Engagement

Pub	Number of international journal publications for each year
Coll	Number of joint Publications with international scholars for each year
Conf	Number of International Conference presentations for each year
Fund	Number of international research funded activities for each year
Aff	Number of international affiliations to professional bodies for each year
Proj	Number of times participating in international projects for each year

**Appendix 3: Access Letter to National Council for Higher Education**

National Council for Higher Education  
13 AUG 2015  
RECEIVED

University College London  
Institute of Education  
20 Bedford Way  
London WC1H 0AL  
United Kingdom.

12<sup>th</sup> August 2015.

The Executive Director,  
Uganda National Council of Higher Education,

Dear Sir,

**Re: Request for Research Access**

This is to request for permission to conduct research involving your institutional archives. The research is part of the requirements for the award of PhD at University College London.

The study aims at assessing the extent to which study abroad experiences affect global engagement in research for higher education academic staff in Uganda. Part of this study involves a curriculum vitae analysis for research performances. Aware that your institution collects and maintains records of research outputs including curriculum vitae of academics, permission to access this data offers me an opportunity to utilize it. The process of data collection is envisaged to take a period of two months.

Outputs for this study will include the doctoral thesis and international journal publications. However, I also intend to acknowledge your contribution to the success of this study by among others submitting a report of findings for your attention.

Should you be in need of more information, I am available at on telephone number 0776661613.

Best regards,

Wilson Eduan  
PhD Candidate (UCL)