Spring 2021

Institutional Context Drives Mobility: A Comprehensive Analysis of How Academic and Economic Factors Relate to International Student Enrollment at United States Higher Education Institutions

Natalie Irby Cruz
Old Dominion University, natalieirbycruz@gmail.com

INSTITUTIONAL CONTEXT DRIVES MOBILITY: A COMPREHENSIVE ANALYSIS OF HOW ACADEMIC AND ECONOMIC FACTORS RELATE TO INTERNATIONAL STUDENT ENROLLMENT AT UNITED STATES HIGHER EDUCATION INSTITUTIONS

by

Natalie Irby Cruz
B.A. May 2007, Clemson University
M.Ed. May 2011, University of South Carolina

A Dissertation Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
Requirements for the Degree of

DOCTOR OF PHILOSOPHY

HIGHER EDUCATION

OLD DOMINION UNIVERSITY
May 2021

Approved by:

Dr. Christopher R. Glass (Director)

Dr. Anthony Perez (Member)

Dr. Cathy Wu (Member)

Dr. Melissa Whatley (Member)

ABSTRACT

INSTITUTIONAL CONTEXT DRIVES MOBILITY: A COMPREHENSIVE ANALYSIS OF HOW ACADEMIC AND ECONOMIC FACTORS RELATE TO INTERNATIONAL STUDENT ENROLLMENT AT UNITED STATES HIGHER EDUCATION INSTITUTIONS

Natalie Irby Cruz
Old Dominion University
Director: Dr. Christopher Glass

International student enrollment (ISE) has become a hallmark of world-class higher education institutions (HEIs), particularly as global student mobility has grown exponentially worldwide in the last several decades. Although the United States (U.S.) has welcomed the largest numbers of international students since the 1950s, ISE shrunk by 10% in the previous three years from an all-time high of 903,127 students in 2016/2017 (IIE, 2019). A synthesis of research studies about international student mobility and enrollment highlights the significant role that academic and economic rationales play for international students who choose the United States. This quantitative, *ex post facto* study focused on how ranking, tuition, Optional Practical Training, Gross Domestic Product, and the unemployment rate connected to ISE at 2,884 U.S. HEIs from 2004 to 2019 through the examination of four research questions. Data were analyzed for two longitudinal research questions using time series regression, particularly an Arellano-Bond estimator for an autoregressive distributed lag model. Linear OLS regression was used for the remaining two research questions which analyzed the variables for the 2018/2019 academic year, including OPT. Data were also analyzed using Carnegie classification (CC) as a grouping variable to better understand how the predictors influenced different types of institutions.

Results included that tuition was an important predictor of ISE, but it looked differently for different types of institutions. Higher ranking connected with higher ISE at doctoral institutions, but it was a deterrent at other institutions in the longitudinal analysis. This novel analysis of OPT showed that the number of students utilizing OPT was related to ISE, particularly at non-doctoral institutions. This study also provided evidence that an urban location is important for ISE. Implications include the importance of advocating for sustainable federal immigration and employment policies, that context and institutional type influence ISE trends, and HEIs should better support international students in the United States to meet their career goals. With the recent decline of ISE and the long-term effects that COVID-19 is likely to have, U.S. HEIs will have to think innovatively and holistically to continue to enroll large numbers of international students.

Keywords: higher education, immigration policy, international student enrollment, time series

Dedication

This is dedicated to the international students and friends who sparked my interest in international education, and the many international students I have worked with over the years who continually inspire me and give me professional purpose.

ACKNOWLEDGMENTS

I knew that completing a dissertation was going to be a challenge, but then COVID-19 hit and made everything infinitely more complicated. I don't think anyone ever expects or prepares to conduct the entirety of their dissertation during a pandemic. Even more than I could have ever imagined when I started this program, I am eternally grateful to the many people who made this possible. There are many people I wish to acknowledge, but my words can never fully convey the indelible impact that so many people at ODU and beyond have made on my personal and professional journey.

First, I want to acknowledge my committee members: Dr. Chris Glass, Dr. Tony Perez, Dr. Cathy Wu, and Dr. Melissa Whatley. You all brought so much insight and wisdom to this project, and my work is infinitely better because of your feedback. Taking Dr. Wu's theory class in International Affairs outside of my department really pushed me to think differently about my study and how I can translate it to other fields. Dr. Perez was instrumental in teaching me regression and that it can be enjoyable! Dr. Whatley, this dissertation would have looked very different without your quantitative insights. You always encouraged me to think about the reasoning and theory behind the analysis, and to push myself a little further. Your constant support, knowledge, and encouragement have made me a better researcher.

Dr. Glass, you are the reason I came to ODU, and I knew from the moment we first spoke that we had the potential for a great partnership. We have spent hundreds of hours together on countless projects and having you as my dissertation chair is really the pinnacle of three years of mentorship. You have shown me how to be a better researcher – to use innovative methods and inquiries to push the field forward. Having you as a professor and

teaching alongside you in several courses have shown me the value of providing detailed feedback, the importance of providing space for students to be themselves in class, continually revamping the course with new materials, and adapting the course for the students in the class. You supported me in this dissertation process long before you were technically the chair. You have helped me immensely as I've refined my ideas, and through the many unexpected twists and turns in conducting such a comprehensive study. I have been very fortunate to have a number of good mentors throughout my life, but you stand head and shoulders above them all.

I am also incredibly grateful to the many faculty members and fellow students who made me a better scholar. To Dr. Mitchell Williams, who set the stage in Proseminar for a productive and intentional dissertation journey and has one of the kindest spirits I know. To Dr. Laura Smithers, you taught me to throw convention to the wind and think big about research. Even though I never had you for a course, you were incredibly supportive. Dr. Commodore, you opened my eyes to the world of governance and always kept us grounded. To Dr. Dennis Gregory, who really got me started in the process of considering ODU for school, and always was an encourager and a straight shooter. To Kim Bullington, you provided direction and a great start in dissertation seminar and offered unwavering and needed help throughout the process. To EPPE Faculty – Dr. Shana Pribesh, Dr. Linda Bol, Dr. Tony Perez – I am grateful for the different perspectives I learned from each of you, as well as how to be a good steward of educational research. To Dawn Hall, who made me feel welcome at ODU, was always helpful, and was one of the main reasons I liked to work in the department.

To my cohort mates – Heidi Fischer and Tabasum Woloyat – it has been an honor to be on this journey with you. You all have encouraged me, listened to me vent, and taught me how to be a better scholar. I am grateful for the many texts, meals shared together, and Zoom calls over the years. To the EPPE folks – Melissa Quackenbush, Kendra Hall, Arianna White, Wanda Brooks, Yuanyuan Ye, and Delaram Totonchi – it was wonderful to have class with some of you, work with others in person (pre-COVID), and get to know you better through F3 and departmental gatherings. To other HIED folks – Hannah Hou, Asuka Ichikawa, Kim Cossey, Yousef Abraham, Laura Solesby, and Courtney Belmonte – I am so grateful that our paths overlapped, and I was able to have class, conduct research, and work with many of you. There are too many other CCL students and other folks to name, but please know that I am grateful to each of you – I truly believe that each person you meet comes into your life for a reason.

There are several other professors and colleagues along the way that helped to ignite a spark for research and writing that eventually led me to pursue this program. For Dr. Robin Kowalski, conducting psychology research with you and writing my honors thesis at Clemson was really a crash course for the PhD program 11 years later, although I had no idea at the time! Dr. Jennifer Bloom, my first published article was because of you and the class assignment where you prepared us to publish. You have always been supportive as I continued in my higher education career, and I consider you a great mentor. Dr. Patrick Hickey, your mentorship and desire to publish and apply for grants about the great work we were doing at Capstone got me in the right mindset for connecting research to practice.

My family has been the rock of my journey. I am eternally grateful to my Mom, Dad, and Mother-in-law and Father-in-law for their support and encouragement throughout this

process. To the many other family members, you have all been so supportive of me and David throughout this journey. Your belief in me drives me forward. To my boys, Atticus and Nico, although this dissertation has caused me to miss out on some important moments, you also were the ones who motivated me to keep going. I hope that one day you can look back on this and realize that you are capable of anything you set your mind to. And in a world where you can be anything, be kind.

To David, my husband, partner, and best friend. I quite literally could not have done this without you. I know that the journey was very challenging at times, but we got through it, and I daresay are even more tightly connected because of it. In particular, I am grateful for the many meals you prepared and brought to me while I was studying or in class, for the hundreds of hours you were with the boys doing fun and engaging things, for the encouragement you provided when I didn't think I was good enough, and for being a little crazy enough to say yes to this journey with me. You are the best part of me, and I am eternally grateful to you.

It's hard to believe that my doctoral journey is almost over. The old parenting trope of "the days are long, but the years are short" definitely apply to a PhD program. The many papers written, articles read, meetings had, classes taken, and research conducted have all culminated in this dissertation. Most importantly, the program facilitated meaningful relationships and transformed me into a scholar and better person.

NOMENCLATURE

ARWU	Academic Ranking of World Universities/Shanghai Rankings
BEA	Bureau of Economic Analysis
CPT	Curricular Practical Training
DACA	Deferred Action for Childhood Arrivals
DHS	Department of Homeland Security
DOC	Department of Commerce
DOS	Department of State
F-1	Academic Student Visa
FOIA	Freedom of Information Act
GDP	Gross Domestic Product
H-1B	Non-Immigrant Visa for Specialty Workers
HEIS	Higher Education Institutions
ICE	Immigration and Customs Enforcement
IIE	Institution for International Education
IPEDS	Integrated Postsecondary Education Data System
ISE	International Student Enrollment
ITA	International Trade Administration
J-1	Exchange Student Visa
M-1	Vocational Student Visa
NAFSA	Association of International Educators
NCES	National Center for Education Statistics
ODU	Old Dominion University
OECD	Organisation for Economic Co-Operation and Development
OLS	Ordinary Least Squares
OPT	Optional Practical Training
PBS	Point-Based System
QS	Quacquarelli Symonds
SEVP	Student and Exchange Visitor Program
SEVIS	Student Exchange and Visitor Information System
STEM	Science, Technology, Engineering, And Mathematics
THE	Times Higher Education
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
USCIS	U.S. Citizenship and Immigration Services
USNWR	U.S. News and World Report
WST	Worlds-Systems Theory

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Higher education institutions (HEIs) in the United States (U.S.) have long relied on their strong academic structures, economic opportunities, rankings, and overall higher education capacity to attract international students (Altbach, 2004; Mazzarol & Soutar, 2002; Wei, 2013). The majority of international students have chosen to study in the United States since official statistics and tracking began (OECD, 2019), but other countries have rapidly increased their ISE in recent years. ISE in the United States, however, has declined for the past four years alongside immigration policy changes and other challenges (Institute of International Education [IIE], 2020c). As more countries shift toward economic structures focused on knowledge production, attracting competent workers worldwide is essential to maintain and build an economically prosperous country (Marginson, 2006). Leaders can grow their country's human capital and knowledge workforce through enrolling and retaining international students.

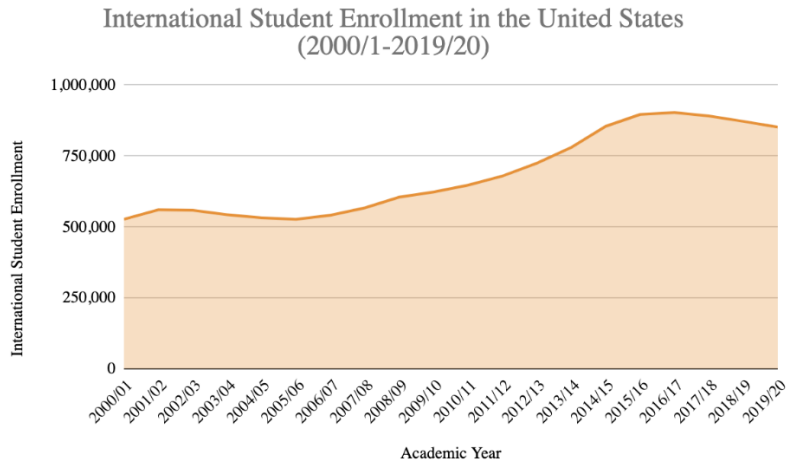
As the higher education landscape and ISE continue to shift and evolve, it is vital to understand ISE's leading drivers in the United States. Although researchers have looked empirically at global or nation-wide mobility and broader trends (Kondakci et al., 2018; Macrander, 2017b; Yeakey & Yin, 2019), few studies have examined mobility beyond national trends or an individual institution. The present study goes further than previous research and takes a multidimensional view of ISE in the United States and examines essential factors like ranking, postgraduate employment, tuition, and economic conditions that should explain ISE's institutional and state trends in the last few decades.

Background to Problem

ISE in the United States has continued to increase almost every year from 1949 until 2017. U.S. ISE increased 66% from 526,809 international students in 2000/2001 to 872,214 students in 2018/2019 (IIE, 2019). Figure 1 shows the ISE trends from the last twenty years using IIE data, including 2019/2020.

Figure 1

International Student Enrollment in the United States, 2000/1 – 2019/20



Note. Open Doors Data (IIE, 2020c)

Several major events and circumstances have shaped U.S. enrollment trends in the past 20 years. After the September 11th, 2001 terrorist attacks, there was a modest decline in ISE for the next four years as the United States grappled with immigration challenges, a new international student tracking system (SEVIS), and fears of future terrorist attacks (Choudaha, 2017; Urias & Yeakey, 2009). After the financial recession in 2008 led to HEI budget cuts, HEI administrators saw ISE as a method to provide financial stability (Macrander, 2017a). Much of

the international student growth stemmed from China (IIE, 2019), which underwent a middle-class boom without enough national HEIs to educate its citizens (Choudaha, 2017; Rafi, 2018). ISE in the United States reached its peak in the 2016/2017 year when 903,127 students were enrolled (IIE, 2019). New international student enrollment has declined since 2016/17, although ISE has continued to increase worldwide.

Although HEI admission staff and analysts projected that fall 2020 ISE numbers would decline based on trends in recent years, the ongoing COVID-19 pandemic has upended ISE for the foreseeable future. IIE surveyed 520 HEIs in June 2020 and found that about 50% of HEIs projected declines for fall ISE, while 26% reported similar numbers to the previous years (Martel, 2020). Many international students already decided to enroll before the COVID-19 pandemic, so actual enrollment numbers are likely much lower. A survey of senior leaders by NAFSA found that 78% of senior leaders expected Fall 2020 ISE to decline, resulting in a potential loss to U.S. HEIs of over $3 billion (NAFSA, 2020). In actuality, IIE found (based on the 700 HEIs it surveyed) that new international student rates for 2020/2021 fell 43 percent from the 2019/2020 academic year, and international enrollment overall fell 16 percent (Anderson, 2020).

In addition to the global pandemic, international students experienced delayed visa processing times due to ICE staff cuts and furloughs. ICE's July 2020 guidance that initially required students to leave the country, or not enter at all, will likely cause long-term distrust of the U.S. immigration system (Durkee, 2020). Globally, experts have estimated that it will take five years for ISE to return to stable levels pre-COVID-19 (Mitchell, 2020). All of these issues will likely exacerbate existing downward trends of ISE in the United States.

As worldwide ISE has increased the past few decades, the overall proportion of students that study in the United States has decreased (OECD, 2019). In 1998, two million students studied outside of their home country, of which 28% chose the United States. In 2017, there were 5.3 million international students, and 18% of those students studied in the United States (OECD, 2019). Westernized countries like Australia, Canada, and the United Kingdom have created unified international student recruitment platforms and policies and have even adjusted their immigration structures to accommodate international students (Grimm, 2019; Sa & Sabzalieva, 2018). U.S. immigration policy and political rhetoric has not been as accommodating and welcoming to international students in recent years, which has likely contributed to the recent decline (Pottie-Sherman, 2018; Van de Walker & Slate, 2019).

Network studies that analyzed global student mobility have found that international students hail from more countries and increasingly choose regional and burgeoning destinations, and new higher education hubs (Kondakci et al., 2018; Wei, 2013). Nevertheless, most students continue to attend HEIs in economically prosperous countries (Kondakci et al., 2018; Macrander, 2017b; OECD, 2019; Yeakey & Yin, 2019). Many HEIs have relied on their location in the United States to attract international students, which aligns with research that shows many international students prioritize the country before the HEI (Alfattal, 2017; Marginson, 2006). However, the tide seems to be turning as a confluence of factors including negative political discourse, immigration challenges, increased tuition, and a growing diversity of HEI options have impacted the drivers and directions of ISE (Pottie-Sherman, 2018). It is critically important to understand the main factors that influence ISE in the United States, particularly as higher education enters a new era where the United States is beginning to lose its competitive edge to attract the best students worldwide.

Rationale for Study

There has been a proliferation of empirical studies that examine international students' motivations for attending college in the United States, as well as policy and advocacy reports about data and trends to explain the current ISE landscape (Choudaha, 2017; IIE; 2019; Nicholls, 2018; Ruiz, 2014; Shen, 2016; Van Alebeek & Wilson, 2019). Much of the literature has focused on international students in Anglophone, developed, or economically emerging countries (Mazzarol & Soutar, 2002; Urban & Palmer, 2016; Wei, 2013; Wilkins et al., 2012). A synthesis of research studies demonstrates that international students typically choose the United States because of the academic structures, prestige of HEIs, potential for economic returns, and career opportunities (Marginson, 2006; Mazzarol & Soutar, 2002; Nicholls, 2018).

This study contributes to the growing body of research about international student mobility (Kondakci et al., 2018; Wei, 2013), the responses and rationales of institutions for ISE (Alfattal, 2017), and how economic and immigration policies may impact ISE (Grimm, 2019). This study goes beyond examining ISE solely at the national level, by focusing on individual HEIs and characteristics shared by HEIs in different states like economic conditions. Additionally, there is a growing need for more research about the impact of employment attainment and immigration policies on U.S. ISE (Shih, 2016). Although international students often choose the United States based on the potential for economic returns and employment opportunities (Han et al., 2015), it is unknown whether the economic vitality of the HEI's location factors into students' choices. Lastly, in a time of rapidly changing ISE, there is a great need for more longitudinal studies that examine the trends over time and how certain institutional factors may impact ISE in different ways (Macrander, 2017a). In summary, this study took several novel or understudied approaches: (a) a large-scale focus on mobility at the individual

HEI level; (b) an examination of how postgraduate employment, or rates of Optional Practical Training (OPT), may connect to ISE; (c) how the economic conditions of a HEI's location may relate to ISE; (d) a longitudinal analysis of ISE in the United States; and (e) an analysis of non-doctoral institutions. Trends and rationales for ISE are decoupled from a specific institution or set of students by using extant data from the last 16 years. This analysis allows for a greater understanding of important factors that influence ISE in the United States.

Purpose Statement

The purpose of this *ex post facto* quantitative research study was to understand how ranking, OPT, tuition, Gross Domestic Product (GDP), and the unemployment rate relate to ISE in the United States, particularly by examining trends over time at the institutional level and how they may differ based on institutional type. Each HEI is situated within an individual state and local context, impacting its positioning and appeal to international students. The perceived academic quality of HEIs and economic opportunities are some of the main reasons that international students choose to attend college in the United States. The five main predictors examined in this study– HEI ranking, OPT, tuition, state GDP, and state unemployment rate– correspond and serve as a proxy for the main factors that attract international students to the United States (Han et al., 2015; Mazzarol & Soutar, 2002; Nicholls, 2018). A longitudinal examination of pertinent academic and economic factors from an institutional level should provide insights on ISE trends in the United States.

Research Question and Hypotheses

Four research questions guided this research study:

- RQ1: How does international student enrollment at U.S. higher education institutions relate to ranking, tuition, GDP, and the unemployment rate from 2008 to 2019?

- RQ2: How does international student enrollment at U.S. higher education institutions relate to ranking, tuition, GDP, and the unemployment rate from 2008 to 2019 when differentiated by Carnegie classification?
- RQ3: How does international student enrollment at U.S. higher education institutions relate to ranking, Optional Practical Training rates, tuition, GDP, and the unemployment rate in 2019?
- RQ4: How does international student enrollment at U.S. higher education institutions relate to ranking, Optional Practical Training rates, tuition, GDP, and the unemployment rate in 2019 when differentiated by Carnegie classification?

Ten hypotheses were proposed in line with the research questions.

- H_a1: *U.S. News and World Report* (USNWR) ranking and ISE will have a positive relationship.
- H_a2: OPT and ISE will have a strong positive relationship.
- $H_0 3$: Tuition rates will not have a statistically significant effect on ISE.
- $H_a 4$: GDP and ISE will have a positive relationship.
- $H_a 5$: ISE and unemployment rates will have a negative relationship.
- $H_a 6$: Ranking will be a significant predictor for CC1.
- $H_a 7$: Tuition will be a significant predictor for CC1.
- $H_a 8$: GDP will be a significant predictor for CC3 and CC4.
- $H_a 9$: Unemployment rate will be a significant predictor for CC3 and CC4.
- $H_a 10$: OPT will be a highly significant predictor for CC1 and CC2.

Study Methodology

This study adds to ISE empirical literature by examining secondary data to better understand international student flows to HEIs. I used an *ex-post-facto* quantitative approach that examined the impact of ranking, postgraduate employment, tuition, and economic conditions on ISE in the United States. The analysis of the institutional type also illuminated that there were differences based on the Carnegie class. Data were analyzed from the 2003/2004 to 2018/2019 academic year to better understand how these factors have shifted over time in response to significant events. Some of these critical events include HEI's increase in international student recruitment after the 2008/2009 recession, steady tuition increases, recovery after the 9/11 attacks, new visa policies and restrictions, OPT STEM extensions, changes in sending countries' policies, and different presidential administrations (Choudaha, 2017; Macrander, 2017a; Pottie-Sherman, 2018). Chapter 3 describes the study methodology in detail.

Data Sources and Variables

Data were retrieved from four different government agencies and one media company. This included the National Center for Education Statistics (NCES) nestled under the Department of Education, Immigration and Custom Enforcement (ICE) under the Department of Homeland Security, the Bureau of Economic Analysis (BEA) situated in the Department of Commerce, and the Bureau of Labor Statistics (BLS) within the Department of Labor. I also used U.S. News and World Report (USNWR) ranking lists.

Outcome Variable

ISE data was provided by the National Center for Education Statistics (NCES), specifically the Integrated Postsecondary Education Data System (IPEDS). IPEDS is a data collection and reporting arm of the U.S. Department of Education, and it collects annual

information from every higher education institution that receives federal student financial aid (NCES, n.d.-a). A HEI was included in this study if: (a) it enrolled at least one international student from 2003/2004 to 2018/2019 (or just 2018/2019 for RQ3 & RQ4); (b) it was degree-granting; (c) it was non-profit; and (d) it was located in one of the 50 states, the District of Columbia, or the Commonwealth of Puerto Rico. If an institution closed or merged with another institution during the timeframe, it was not included in the dataset. The final sample included 2,884 HEIs, for a total of 46,144 observations for 16 years of data, and 31,724 observations for RQ1.

IPEDS classifies an international student as a *nonresident alien,* which is defined as "a person who is not a citizen or national of the United States and who is in this country on a visa or temporary basis and does not have the right to remain indefinitely" (NCES, n.d.-c, "Nonresident alien"). Although students utilizing the Deferred Action for Childhood Arrivals (DACA) program are sometimes listed under the same nonresident alien category, IPEDS data was still determined to be the most accurate and accessible source of international student data for this study. Chapter 3 discusses more about IPEDS as well as the rationale for choosing IPEDS data for ISE over other possible data sources.

Predictors

HEI ranking is measured by the national and regional colleges and universities ranking lists of the *U.S. News and World Report* (USNWR)*,* which examines accredited, non-profit, tertiary education institutions. I obtained the ranking lists for the reviewed years through publicly available data, the university library, and purchasing older magazines.

OPT data, which is how postgraduate employment is measured for this study, was obtained from ICE. I received the 2019 data through a Freedom of Information Act (FOIA)

request. Some OPT data from 2004-2019 was available on their website, but the data were not standardized across the timeframe and could unfortunately not be used. By the time of data analysis, I had not heard back from several other FOIA requests for additional OPT data, so I was only able to analyze 2019 data.

State GDP was used as one economic indicator for this study. Historical data were retrieved from the BEA website. All monthly reports were averaged to create a yearly GDP for each state, which served as an economic indicator for each HEI located in that state. The yearly data were also adjusted to align with the typical academic year (August – July).

Yearly unemployment statistics from 2004 to 2019 for all 50 states were used as an economic indicator. The unemployment data were retrieved from the BLS website.

Tuition data was provided by IPEDS, typically the out-of-state, undergraduate tuition rate for public institutions, and undergraduate tuition for private institutions. For HEIs that did not enroll undergraduate students, the out-of-state tuition for graduate students was used. At comprehensive institutions, undergraduate tuition was best used as a proxy for cost, which allowed for an understanding of how tuition rates may affect ISE.

Grouping Variable

The Carnegie classification (CC) of HEIs was used as a grouping variable to answer the second and fourth research questions. These groups are referred throughout the study as CC1, CC2, CC3, and CC4. The groups included: (a) CC1: Doctoral Universities - Very High Research Activity (Also referred to as Research 1 institutions); (b) CC2: Doctoral Universities: High Research Activity and other Doctoral/Professional Universities; (c) CC3: Master's Colleges and Universities, and Baccalaureate Colleges; and (d) CC4: Baccalaureate/Associate's Colleges,

Associate's Colleges, Special Focus Institutions, and Tribal Colleges. All 2,884 analyzed institutions had a CC.

Control Variables

Six HEI characteristics were included as control variables, including the total student population, CC (for RQ1 and RQ3), campus setting, STEM degrees awarded, graduate student population, institutional funding category, and the U.S. state. All control variable data was retrieved from the IPEDS data (NCES, 2020).

Data Analysis

Institutional data from 2003/2004 to 2018/2019 were combined into one master dataset for the first two research questions (RQ1 and RQ2). There were 2,884 institutions and 31,724 observations for the 12 years analysis (including the four years of lags). I answered the first two research question through time series regression, particularly an autoregressive model with an Arellano-Bond (AB) Dynamic Estimator. Time series enabled me to examine each of the main predictors' change over the studied period. Due to the specifications of the time series model, several fixed-effects control variables were not able to be included in the analysis for RQ1 and RQ2, which included state, institutional funding type, and campus setting. Analysis including OPT for 2018/2019 was conducted using Ordinary Least Squares (OLS) Regression for RQ3 and RQ4, which included all predictors and control variables. CC was used as a control variable for RQ1 and RQ3, and as a grouping variable for RQ2 and RQ4. All analyses were conducted in STATA 16.1. Time series analysis is most commonly employed within business, applied sciences, and engineering fields, so it will be a relatively novel analysis technique for the educational research field (Wooldridge, 2000).

Theoretical Frameworks

This study was informed by two main theories: the worlds-systems theory (WST) (Wallerstein, 2004) and human capital theory (Becker, 1993). WST hypothesizes that wealthy, developed, often western countries dominate the global economic landscape, drawing resources from other less developed countries to solidify their economic prowess (Wallerstein, 2004). Human capital is the skills and knowledge that people gain in formal and informal learning. Individuals can invest in their human capital through education or other resources that better their economic and professional potential (Becker, 1993). Organizations and governments can also invest in their constituents to advance human capital to better the country through increased economic activity. The academic and economic rationales for international students to attend college in the United States can be better understood through the lens of human capital. The underlying power and privilege that U.S. HEIs have in a landscape can be explained in part by the WST principles. These two theories are described in more detail in Chapter 2.

Operational Definitions

For the purpose of this study, key concepts and terms are defined as follows:

- *International Student*: A person who is enrolled in an academic program of study at a U.S. HEI on a non-immigrant student visa, including F-1, J-1, or M-1 (IIE, 2020b)
- *International Student Enrollment:* The number of degree-seeking international students enrolled at a HEI in a particular academic year
- *Higher Education Institution:* An accredited, non-profit, postsecondary education institution that offers academic credentials and is located in the United States
- *Postgraduate employment:* International students using the Optional Practical Training (OPT) program

- *Optional Practical Training:* A temporary work authorization that international students can utilize after graduating from a college or university in the United States (USCIS, n. d.-b)

Significance of the Study

As the flows in ISE diversify worldwide, and ISE in the United States is trending downward partially due to unfriendly immigration policy and growing economic opportunities in other countries, it is critical to examine important factors that draw international students to the United States. There have been many studies that investigate why international students choose to attend a HEI in a particular country or to learn about how international students transition to HEIs (Ahmad et al., 2016; Cubillo et al., 2006; Findley, 2011; Mazzarol & Soutar, 2002; Mamiseishvili, 2012). This study examined the influence of several factors on ISE that have not been empirically studied on a large scale, specifically ranking, OPT, economic conditions, and tuition. HEIs have come to rely on international students at their institutions for various reasons, including diversity of thought, prestige and legitimacy, research and development, and increased revenue (Chen et al., 2019). This study helps explain how academic and economic factors may contribute to ISE. This should help U.S. higher education and immigration policymakers better understand ISE flows and international students' rationales to prepare for the future.

Delimitations

This study had several delimitations that helped narrow the scope. ISE was only examined at accredited, non-profit HEIs in the United States, which still amounted to 2,884 HEIs. ISE data is examined in the aggregate for academic level, which means that the data was not differentiated by undergraduate and graduate students. Additionally, IPEDS data does not allow for the differentiation of student nationality, so this study does not examine trends from

sending countries. Data that correspond to the prominent academic and economic motivations for international students are used, which means that other potential student motivations like personal, political, or cultural factors are not examined.

Summary

ISE will continue to play an essential role in the vitality and prestige of U.S. HEIs, but numbers are shifting downward domestically as ISE rises in most other countries worldwide. This longitudinal *ex post facto* study used data from 16 years to examine significant factors that relate to ISE in the United States, including ranking, postgraduate employment, tuition, and economic conditions. The effect of the predictors on ISE was also analyzed according to the institutional type. This chapter described the background, rationale, significance of the study, purpose, research questions, operational definitions, and hypotheses. The methodology and theoretical frameworks were briefly discussed and will be further developed in subsequent chapters. This study illuminated some of the significant factors that influence international student enrollment in the United States, so that HEIs and policymakers can better respond to shifts and trends in a quickly evolving global higher education landscape.

CHAPTER II

LITERATURE REVIEW

Global and U.S. higher education is undergoing rapid change, particularly in light of the ongoing COVID-19 pandemic. ISE has become a staple of the global higher education market, and many countries compete for top-tier students worldwide (Altbach & Knight, 2007). A prospective international student may consider dozens of institutions in several different countries. What draws students to an institution in Singapore might not actually be that different from why they are interested in attending a university in Michigan. ISE increased over 50% worldwide in the previous decade, and the overall number of international students now surpasses five million (OECD, 2019). Many U.S. HEIs broadened their international recruitment activities to increase revenue after the 2008-2009 financial crash since international students typically pay higher tuition and fees than domestic students (Krsmanovic & Sabina, 2020; Macrander, 2017a). International students enrolled in U.S. HEIs peaked at 903,127 in 2016/2017 but have declined 10% in the past three years (IIE, 2019).

This chapter begins by broadly discussing trends of ISE in the United States and worldwide in the last 20 years. I discuss primary motivations for international students' institutional choices as demonstrated by the academic literature, particularly factors used as variables in this research study. These motivations include academic quality or prestige; immigration, employment, and economic factors; and geographic and spatial aspects. I also discuss the theoretical foundations for this study, which are the world systems theory and human capital theory. This research study will contribute to the academic literature by using existing data to examine how ranking, OPT, tuition, and economic conditions impact ISE in the United States at an institutional level.

International Student Enrollment and Mobility Background

The recruitment and retention of international students have become a priority for most HEIs worldwide (Altbach & Knight, 2007; Mamiseishvili, 2012). Not only do international students bring prestige and tuition dollars to an institution and its surrounding area (Delgado-Márquez et al., 2013, Macrander, 2017a; NAFSA, 2019), but they also increase the skilled mobility and human capital in the host country (Chen et al., 2019). International students' enrollment stimulates economic growth and increases global influence for the host countries with increased tuition and highly skilled labor potential (Demirci, 2019; Gesing & Glass, 2019; Shih, 2016). NAFSA estimated that in 2019, international students contributed $41 billion dollars to the national economy and created or supported 458,290 jobs (NAFSA, 2019). COVID-19 has impacted the higher education sector and economy in major ways, with reports estimating that the United States will lose close to three billion dollars due to fewer international students (NAFSA, 2020).

ISE has dispersed and diversified in the last few decades, but long-standing patterns and Anglophone, or English-speaking, dominance are still prevalent in today's international education landscape. Although this study focuses on ISE in the United States, it is essential to understand the present moment's context and how ISE has evolved.

Worldwide

ISE continues to grow worldwide, and as of 2017, was numbered at 5.3 million students (OECD, 2019). Students have studied abroad since the time of ancient Greece and Rome (Bevis & Lucas, 2007). As the industrial revolution and globalization created ripples of development in most corners of the world, more students have chosen to study abroad. International student mobility has become much more viable and accessible in the 21st century (Bevis & Lucas,

2007). Mobile students have sought educational opportunities, experiences with other cultures and languages, and career potential (Bevis & Lucas, 2007; McMahon, 1992). ISE increased by 165% since 1998 (OECD, 2019), and most mobility continues to flow toward Western or Anglophone countries. In general, ISE follows an East-West trajectory, although regional higher education hubs' success has shifted ISE slightly in recent years (Kondakci et al., 2018). This shift is aided by the international branch campuses and the growing higher education capacity of developing and middle-income countries (Macrander, 2017b). Many students now choose to stay in their home country for tertiary education or attend college in a country within the same region (Ahmad et al., 2016). Although regional mobility has grown, 40% of international students still attend college in either the United States, the United Kingdom, Australia, or Canada, demonstrating the importance of the English language for international students (OECD, 2019). Although the United States has lost some of its global student market share, it still receives the highest numbers and most international students (OECD, 2019). It remains to be seen how the COVID-19 pandemic will impact ISE in the long-term, although numbers are projected to decrease at least in the short-term (DePietro, 2020; Martel, 2020; Mitchell, 2020).

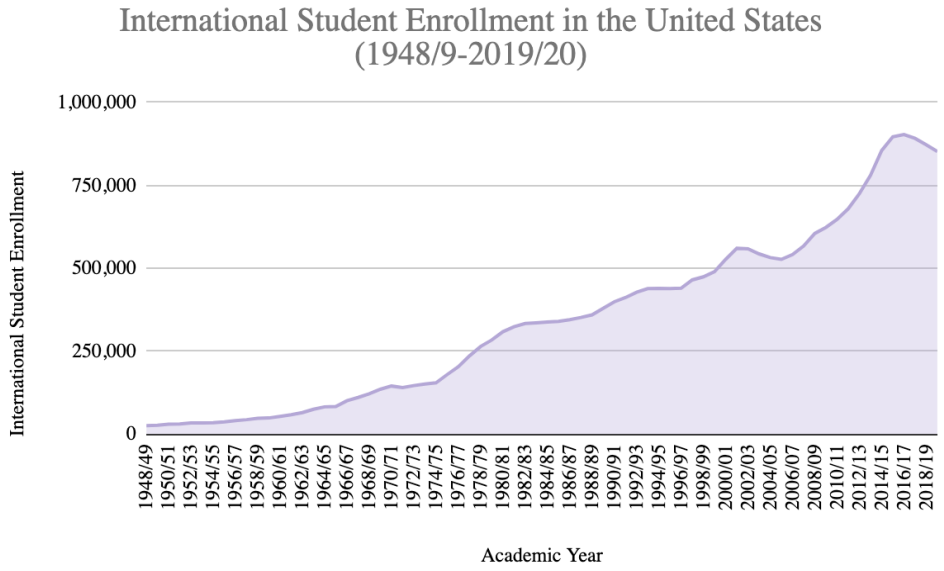
United States

The United States currently receives 18% of the world's globally mobile students (OECD, 2019). Even with a decentralized national strategy compared to other countries, U.S. ISE has continued to grow mostly due to the academic quality of the institutions, the economic and employment opportunities, and the prestige and notoriety of the U.S. higher education system (Marginson, 2006). ISE has steadily increased since 1949 with minor declines after the 9/11 attacks until the 2017/2018 academic year (IIE, 2019). According to the IIE's Open Doors

report, ISE reached its peak in 2016/2017 (IIE, 2019). See Figure 2 for a visual representation of how ISE has evolved over the last 70 years.

Figure 2

International Student Enrollment in the United States, 1948/49 – 2019/20



Note. Open Doors Data (IIE, 2020c)

ISE in the United States grew exponentially after the 2008/2009 financial crash, primarily due to enhanced recruitment efforts from many public and flagship institutions (Krsmanovic & Sabina, 2020; Macrander, 2017a). Undergraduate international enrollment in particular has increased, overtaking graduate enrollment in 2011. In the 2018/2019 academic year, graduate students comprised 43% of the total ISE (IIE, 2019). International students bring numerous academic, social, and other positive factors to campus (Pottie-Sherman, 2018). Studies and reports, however, have found that the decrease in state appropriations and overall budget cuts were connected to the increase in tuition from international students (Macrander, 2017a; Shen,

2016). U.S. HEIs have grown their staff, programs, and facilities to provide for international students, and now in the face of decreased enrollment, many institutions are having to rethink their global recruitment strategy and their reliance on international students to bridge the financial gap (Fisher, 2020; Krsmanovic & Sabina, 2020; Wong, 2019).

Some journalists, practitioners, and academics have been quick to blame the recent decline in international student on the volatile political climate and immigration restrictions, but there is a confluence of factors that may cause many international students to consider studying in countries other than the United States (Pottie-Sherman, 2018; Wong, 2019). Increased tuition and fees have made attending a tertiary education institution in the United States out of reach for many families (Krsmanovic & Sabina, 2020). When students choose to attend a HEI in the United States, the data show that they prefer more private elite or public flagship institutions (IIE, 2019; Pham et al., 2019; Pottie-Sherman, 2018). This study's primary goal is to empirically examine the changing enrollment trends within the United States to determine important economic and academic factors at the institutional and state level that influence ISE.

Theoretical Foundations

This study draws from several theories to understand ISE in the United States. The theories are framed through the reference of the benefits to the receiving country, state, and institution, and the rationales of students.

World Systems Theory

World-systems theory (WST) conceptualizes and explains the flow of capital and human labor in the globalized economy (Wallerstein, 2004). Wallerstein (2004) postulated that world economic structures operate in a system where "core," wealthy, developed countries funnel commodities, trade, and labor from lesser developed countries, thus monopolizing and stifling

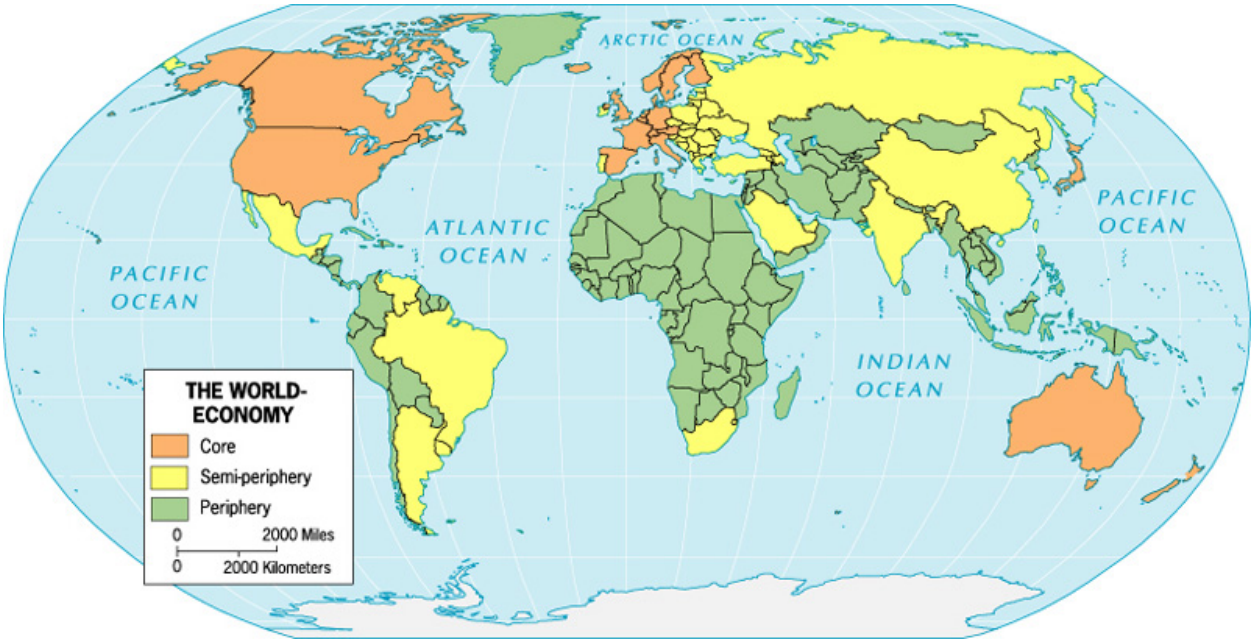
economic growth in those "periphery" countries. This extends to the tertiary education landscape because most well-regarded universities are located in developed countries, which pulls international students away from their home countries and can result in lost human capital (Gesing & Glass, 2019; Mazzarol & Soutar, 2002). These prestigious and highly ranked HEIs tend to control knowledge production flow, have the best infrastructure, employ the most highly qualified staff, and lead globally in research and development (Macrander, 2017b). Using WST as a frame of reference, the United States will continue to receive the most international students as long as students view U.S. HEIs as having strong academic and economic resources to provide them with a more prosperous future. This theory may also apply to more developed cities and states within the United States, which may welcome more international students and continue to receive more prestige and financial benefits from international students living in their region (Macrander, 2017a; NAFSA, 2019).

The WST is interwoven with the supply-side higher education marketization seen in virtually all western or developed countries that have strived to grow their international student populations in the 21st century (Findlay, 2011). Supply-side theories postulate that ISE is "strongly shaped by the financial interests of those who organize, supply and market elite higher education opportunities within the global economy" (Findlay, 2011, p. 163). As globalization has grown and the student demand for international credentials has increased, well-resourced universities have recruited and enrolled international students who often pay higher tuition and help to subsidize the HEI (Cantwell, 2015; Macrander, 2017a; Shen, 2016). Much of the recent wave of international students have come from middle- or upper-class families. They often bring embedded cultural capital with them that also raise the prestige and cosmopolitanism of the HEI (Findlay, 2011). It could be argued that even within the U.S. higher education system, there is a

microcosm of the WST that is exemplified by the prestigious or highly ranked HEIs, who enroll and attract a more significant number of students than the core, periphery HEIs (Marginson, 2006; Wallerstein, 2004). The WST can explain the dominance of U.S. HEIs in ISE. Still, other capital theories help elucidate students' rationales for studying in developed countries. The WST is a commonly used theory within ISE research and is beneficial in explaining patterns and flows of ISE worldwide (Kondakci et al., 2018; Macrander, 2017b; Yeakey & Yin, 2019), The WST original map (Figure 3) is quickly evolving, and as ISE continues to regionalize and diversify, it will be fascinating to see the long-term impact ISE has on the global economy and power structures.

Figure 3

World Systems Theory Map in 1974 (Wallerstein, 2004)



Human Capital Theory

A number of theories explain different types of "capital" that people can accrue throughout their life (Bourdieu, 1986; Pham et al., 2019; Tomlinson, 2017). The pursuit of human, social, and cultural capital has been frequently studied within international student research (Chen et al., 2019; Pham et al., 2019; She & Wotherspoon, 2013), and it sheds light on some rationale and motivations that international students may have to study in the United States. Tomlinson (2017) developed a graduate capital model that focuses on five types of capital that students accrue through their higher education experience and apply in their quest for a postgraduate career. This includes human, social, cultural, identity, and psychological capital. Pham and colleagues (2019) used his model to study international students and found that international students typically have a deficit in the cultural and social capital needed to obtain jobs they desire. The current study utilizes human capital theory as a frame of reference. In particular, human capital theory relates most closely to academic, employment, and career motivations, which are some of the primary reasons that international students choose to study in the United States (Gesing & Glass, 2019; Mazzarol & Soutar, 2002; McMahon, 1992; Perkins & Neumayer, 2014).

The human capital theory in education suggests that individuals invest in higher education to increase their salary and earnings potential (Becker, 1993). Human capital is not limited to wage potential, but most empirical studies have focused on income growth. Countries that provide a free public secondary education (and tertiary education in some cases) are investing in human capital with the expectation that its citizens will contribute economically and further develop the country (Becker, 1993). Indeed, international students invest a significant amount of money in their higher education to attend university in the United States, particularly

since international students often pay much higher tuition than domestic students (Krsmanovic & Sabina, 2020). The human capital theory can be used to suggest that students attend a U.S. HEI with an expectation of increasing their human capital and bettering their employment and earnings potential as a result of graduating with a degree from the United States (Gesing & Glass, 2019).

Institutional Prestige

HEIs have focused on growing ISE in recent decades partly to bolster their prestige and financial stature (Altbach & Knight, 2007; Delgado- Márquez et al., 2013), and there is ample evidence that international students and their families value global and national rankings as an essential heuristic for school selection (Branco Oliveira & Soares, 2016; Hauptman Komotar, 2019; Hazelkorn, 2014; Souto-Otero & Enders, 2017). Although they are not synonymous, prestige and ranking are often used as a proxy for academic reputation and quality (Ortagus, 2016; Volkwein & Sweitzer, 2006). This section discusses the influence of rankings in higher education, the background and different types of ranking systems, criticisms of ranking systems, how international students and internationalization impact rankings systems, and the importance of ranking for international students.

Influence of Rankings in Global Higher Education

Although global rankings are a recent phenomenon, their impact has been monumental and may influence faculty hiring practices, program and major design, or campus facilities (Hauptman Komotar, 2019; Hazelkorn, 2014; Volkwein & Sweitzer, 2006). The usage and influence of rankings look differently depending on the HEI, country, funding context, and student. U.S. HEI professionals mainly focus on national rankings (Marginson, 2006), but since

international students consult global rankings, it is important to understand and differentiate between national and global ranking systems.

Background and Different Types of Rankings

Institutional ranking of graduate schools began in the 1960s, but it was the *U.S. News and World Report* (USNWR) rankings in 1983 that spurred the focus and transformation of rankings in higher education (Hazelkorn, 2014). There has been a proliferation of national rankings in the United States and many other countries in the last 30 years (Campbell et al., 2019). USNWR continues to be the most influential ranking system in the United States, and they have refined and updated their formula based on how the field has evolved (Dill & Soo, 2005; Morse et al., 2019).

The era of global higher education rankings began in 2003 with the Academic Ranking of World Universities (ARWU), also known as the Shanghai Rankings (Hauptman Komotar, 2019; Hazelkorn, 2014). It was quickly followed by the Times Higher Education (THE)-Quacquarelli Symonds (QS) rankings in 2004, which split five years later into two individual rankings systems (Hazelkorn, 2014). There are now at least ten different global rankings systems, but THE, QS, and ARWU are the most widely utilized and compute their ranking based on various formulas (Hazelkorn, 2014). For example, the ARWU focuses only on research and academic factors, while QS and THE include percentages based on international characteristics like the staff and student numbers (Hauptman Komotar, 2019). Reputation is a large proportion of the calculations for USNWR, QS, and THE, but the ARWU attributes 60% for citations and researchers that publish in influential journals (QS, 2019; ShanghaiRanking Consultancy, 2019; THE, 2019). Although the rankings systems weigh factors differently, the top institutions typically fall in similar spots on most lists (Hazelkorn, 2014).

Criticisms of Rankings to Measure Institutional Quality

Although there are evidence that higher-ranked schools have better facilities, resources, faculty, and student completion rates, there are many criticisms and limitations of using ranking to measure the quality of a HEI. All of the aforementioned ranking systems have methodological similarities, but inherent flaws limit their ability to measure institutional quality (Dill & Soo, 2005; Hazelkorn, 2014; Pike, 2004). One of the significant criticisms of ranking systems is how heavily they factor institutional reputation (Campbell et al., 2019) The USNWR justifies their inclusion of prestige by stating, "Academic reputation matters because it factors things that cannot easily be captured elsewhere" (Morse et al., 2019, Expert Opinion section).

Over time, the perception of prestige compounds, effectively shutting out newer and innovative institutions (Marginson, 2006). Initial rankings were defined by specific values like the worth of academic journal citations and high student test scores, and institutions continually make critical choices to reflect and embed those values (Campbell et al., 2019; Marginson, 2006). Institutional reputations reinforced by rankings are also flawed because they make large differentiation between institutions with little actual differences in measured indicators (Bowman & Bastedo, 2009). This focus on reputation reinforces the emphasis that incoming students and their families may place on these "expert opinions" to guide their choices (Bowman & Bastedo, 2009). Although using a ranking system like USNWR is a flawed mechanism to determine academic quality, it is frequently used by students and their parents to choose a HEI.

Influence of International Student Enrollment on Rankings

Internationalization is one of the critical markers of prestige and success in the modern system, and many universities strive to leave their mark globally (Altbach & Knight, 2007). The importance of internationalization for prestige has been boosted by THE and QS by including

international indicators in their calculations (Hauptman Komotar, 2019). USNWR even created a list of best global universities, which includes HEIs worldwide (Morse et al., 2019). There is no specific formula to determine how internationalized a university is. Still, it may consist of components of comprehensive internationalization like international students, scholars, education abroad participation, curriculum internationalization, global partnerships, and collaborative research (Delgado-Márquez et al., 2013; Hauptman Komotar, 2019). THE and QS only examine international student enrollment, numbers of international faculty/staff, or international collaborations (QS, 2019; THE, 2019). Delgado-Marquez and associates (2013) found that internationalization significantly impacts a university's reputation, particularly with highly internationalized institutions. The International Association of Universities' 3rd annual global survey found that *enhancing one's international profile and reputation* was the third most common reason for pursuing campus internationalization (Beelen, 2011). The data show that highly internationalized universities have a higher ranking and that universities increase internationalization efforts to improve their prestige and notoriety on a global scale (Altbach & Knight, 2007; Delgado-Márquez et al., 2013).

ISE is one of the most common ways that internationalization is manifested on campuses, and universities compete globally for the best students. Altbach and Knight (2007) postulated that universities desire more international students in part to increase their prestige. Some countries with more flexible and centralized international education policies, like Canada and Australia, have adapted their visa policies and incentives to attract more international students (Chen et al., 2019; Grimm, 2019; James-MacEachern, 2018). Although the United States has long received the most international students, national visa policy and institutional tuition fees are not friendly to international students. These roadblocks could lead to fewer international

students as other universities raise their global profile, and students' preferences evolve (Ammigan, 2019). Although some studies show that international students focus on academic reputation more than domestic students do (Alfattal, 2017), other studies have found that HEI ranking had a small impact on the actual flow of international students (Perkins & Neumayer, 2014) and that strong rankings are not necessary to grow ISE (James-MacEachern, 2018). Komissarova (2020) examined how ISE growth contributed to a HEI's tuition revenue based on their institutional selectivity and postulated that building prestige and recognition on a global stage was more important than increasing revenue. This ambiguity of internationalization and ISE's importance for rankings mirror the multifaceted decision-making process that international students undergo. Although academic reputation and prestige are essential for international students' decisions in choosing a tertiary institution, there are many other factors that may have a more significant impact on their final decision.

Importance of Rankings for International Student Enrollment

Choosing a HEI is an individualized process for every international student. Although different factors are considered for students' HEI choice, there are clear trends that researchers have identified in a variety of national and institutional contexts. Academic quality is one of the most crucial university determinants for international students (Branco Oliveira & Soares, 2016; McMahon, 1992), which students usually decide by consulting the rankings. International students appear to be more influenced by academic reputation than domestic students (Alfattal, 2017; Branco Oliveira & Soares, 2016), perhaps because students and families have to rely on rankings in the absence of prior knowledge about different HEIs. International students also make a substantial personal and financial investment by studying in another country. The academic quality and accompanying economic potential are some of the main drivers for

international students who choose wealthier, developed countries (Branco Oliveira & Soares, 2016; Perkins & Neumayer, 2014) like the United States. Adding to this, higher-ranked schools typically enroll larger numbers of international students (Branco Oliveira & Soares, 2016), particularly prestigious public HEIs in the United States that have been found to charge higher tuition rates and also attract more international students (Komissarova, 2020; Krsmanovic & Sabina, 2020; Shen, 2016).

International students often pay more tuition and fees than domestic students to receive the same services at U.S. universities, so it is understandable that students and families focus on a return on investment (Ammigan, 2019; Krsmanovic & Sabina, 2020). Students who attend higher-ranked institutions typically go to better graduate schools, find better jobs, and have access to well-known faculty and an abundance of resources during their time in college (Campbell et al., 2019; Ortagus, 2016). In other words, they increase their human and social capital more by attending higher-ranked institutions (Bourdieu, 1986; Pham et al., 2019). These elevated student outcomes are also likely because students enter college with more knowledge and personal resources, and the university's education and support become a bonus (Dill & Soo, 2005; Volkwein & Sweitzer, 2006). Students who enter college with high SAT scores and good grades will do well no matter if they go to an Ivy League or a public comprehensive school. However, prestige begets prestige, so a university’s reputation continues to build on itself and attract the best students (Campbell et al., 2019; Marginson, 2006).

The importance of ranking varies based on the type of international student or what they prioritize. For instance, several studies found that students from developing countries viewed prestige and academic quality as the best way to improve their economic standing and achieve legitimacy in their careers (Perkins & Neumayer, 2014; Rafi, 2018). Rankings may be more

important for students from collectivist cultures because obtaining a degree from a highly ranked prestigious school can uplift their whole family (Souto-Otero & Enders, 2017). This corresponds with the importance of parental influence in many international students' university decisions, which is common in collectivist cultures as well (Rafi, 2018). An institution's ranking is more important for the younger, higher ability students than the non-traditional students (Souto-Otero & Enders, 2017). The highest achieving international students often focus on choosing a particular institution before the country, since their underlying goal is to attend a prestigious institution (Marginson, 2006; Souto-Otero & Enders, 2017). International students seem to prioritize and focus on academic reputation and consult the national and global rankings as an essential factor to help winnow down their HEI choice.

Section Summary

Academic quality plays a significant role in motivations for many international students to enroll in the United States. Students often use ranking systems to identify which HEIs are higher academic quality easily. This section discussed different rankings systems and their flaws, how influential rankings are for international students, and how internationalization may influence global rankings systems. This research study will use USNWR ranking as a predictor to understand how it may relate to ISE in the United States. The next section discusses immigration, employment, and economic factors, which have also been identified as essential motivations for international students in selecting a HEI.

Immigration, Employment, and Economic Factors

Although HEI ranking is an essential element in college choice, international students consider other significant factors when choosing a HEI. International students studying in the United States have to pay high tuition and fees (Cantwell, 2015; Krsmanovic & Sabina, 2020)

and want to know that their education will bring a substantial return on investment (Ammigan, 2019; Chen et al., 2019). Therefore, OPT rates, job placements, and professional support are increasingly important. Many of these factors are considered after students narrow down their choices based on the rankings. Still, they also are more important than an academic reputation for a sizable swath of students (Branco Oliveira & Soares, 2016). This section examines several immigration, employment, and economic factors that may impact students' decision-making, including career resources at HEIs, OPT, H-1B visas, immigration and visa challenges, tuition and fees, and state economic vitality.

Professional Development and Support at Higher Education Institutions

International students typically choose to study in the United States because of the academic reputation, economic opportunities, and professional potential that a U.S degree provides (Popadiuk & Arthur, 2014; Wei, 2013). International students want to make sure that they receive the best value for their tuition dollars. If they do not find employment opportunities and receive career preparation that facilitates finding a job, future students will eventually opt to enroll in other countries that are more conducive to their needs (Loo et al., 2017; Musumba et al., 2011). HEIs can provide more opportunities for international students if they increase communication and understanding of career services on U.S. campuses (Pham et al., 2019; Spencer-Rodgers, 2000). For example, Popadiuk and Arthur (2014) found that international students were largely unaware of on-campus jobs and experiential experiences that can bolster their resumé. Several researchers have found that international students, in particular, need more assistance when it comes to an understanding the cultural nuances and expectations that are embedded within the job application and interview process (Crockett & Hayes, 2011; Ng et al., 2019; Pham et al, 2019). Tailored information for international students could be very useful in

ensuring that international students learn about implicit expectations and develop skills that domestic students may inherently have (Tomlinson, 2017).

HEIs in the United States cannot control federal policy or visa restrictions. Still, they can prepare students to be the best possible candidate for available jobs and equip them with the knowledge to navigate the complex visa acquisition process (Ng et al., 2019; Urban & Palmer, 2016). Although international students often have strong academic records and professional skills, they do not usually know the expectations of other countries' job markets (Crockett & Hayes, 2011; Loo et al., 2017). International students have expressed discomfort with the working environment and the norms that accompany it (Crockett & Hayes, 2011; Pham et al., 2019), which is where career centers and other related offices can assist.

Student Visa Challenges

Students often face additional challenges in obtaining a visa to attend a HEI in the United States or work upon graduation (Han et al., 2015; Pottie-Sherman, 2018; Todoran & Peterson, 2019). Administrators and students have faced challenges with the student visa system for over 20 years, dating back to when the first electronic system was created to track international students studying in the United States (Urias & Yeakey, 2009). Abuse of the student visa system by some foreign nationals necessitated better tracking to increase safety and security. Still, the Student and Exchange Visitor Information System (SEVIS) and ICE regulations have become so complicated that many international student specialists at HEIs spend the majority of their time on compliance issues rather than assisting students.

In recent years, obtaining a visa to study in the United States has become quite arduous and unpredictable (Pottie-Sherman, 2018). The previous presidential administration increased bureaucracy, costs, and hurdles for students to enroll at HEIs, which put a strain on

administrators and students alike (Wong, 2019). International education administrators have cited the increased denial of student visas as one of the main contributing factors for decreased ISE at U.S. institutions (Wong, 2019). Additionally, highly visible proclamations like travel bans have left many international students from targeted countries in limbo or denied when returning to the United States (Pottie-Sherman, 2018; Todoran & Peterson, 2019). One study found that student applications from Muslim-majority countries declined at a much higher rate than non-Muslim-majority countries (Van De Walker & Slate, 2019). Similarly, Muslim majority countries' applications fell after the 9/11 attacks (Urias & Yeakey, 2009). Many U.S. HEIs have strived to overcome the negative messaging with nationwide campaigns like "You are Welcome Here," which assures international students that they will find a supportive community at their HEI (Fisher, 2020). It remains to be seen how long HEIs can counteract the increasingly hostile rhetoric toward international students and immigrants in general from the U.S. government and leadership.

Mandates from ICE during the COVID-19 pandemic increased the unpredictability and challenges for students who come to the United States. In the summer of 2020, ICE implemented and quickly rescinded guidance that barred international students from staying in the United States if all of their classes were held online in the Fall 2020 semester (Durkee, 2020). New international students who had classes solely online could not enter the United States (Durkee, 2020). This provides more evidence for the seemingly unwelcoming nature of the United States for international students. Even though obtaining a student visa has become more complicated, it is considerably easier than trying to work in the United States longer than a few years after graduation.

Optional Practical Training

OPT is a temporary employment opportunity that international students can utilize after graduating from a college or university (USCIS, n.d.-b). Students must first apply for OPT and find a job related to their field of study, and then they can work for 12 months. Students who receive a degree in a science, technology, engineering, or math (STEM) field can apply for a 24-month extension, bringing their total postgraduate work opportunity to three years in the United States (USCIS, n.d.-b). The original STEM 17-month extension legislation was passed in 2008, which coincided with the exponential rise in international student numbers (Demirci, 2019). In 2016, STEM OPT was extended to 24 months. Pre-Completion OPT or Curricular Practical Training (CPT) provides another employment opportunity for international students while still enrolled at a HEI. After one year of enrollment, students can work full-time when they are not in school and part-time when they are registered. All CPT and OPT full-time positions have to be related to students' field of study, and they are unable to take an off-campus job during the academic year like domestic students (USCIS, n.d.-b).

International students widely use the OPT program. In 2014, 68% of international students graduating with a Ph.D. applied for OPT (Wadman & Stone, 2017). Over 1.5 million students utilized the OPT program from 2004 to 2016, more than half of whom were in STEM fields (Ruiz & Budiman, 2018). Since there is no cap on the number of students that can receive OPT, as ISE has grown in the United States, so has OPT. OPT grew at least 20% each year from 2008 to 2016 when the STEM extension was implemented (Grimm, 2019; IIE, 2019). All graduating international students are eligible for OPT, but it can be extremely challenging to find a job and even have the OPT paperwork approved in time to begin a job.

While all international graduates have access to the OPT program, which enables international students to work from one to three years after graduation, recent federal regulations have made obtaining OPT even more challenging (Pottie-Sherman, 2018). OPT regulations and opportunities expanded during the Bush and Obama presidential administrations, but it was still quite challenging for international students to find a job. Considering that one of the main reasons international students choose to study in the United States is to better their employment opportunities, most students desire to temporarily work in the United States to gain work experience (Loo et al., 2017; Ruiz & Budiman, 2018). Unfortunately, student visa and OPT regulations have become more complex and exclusionary in recent years. There was a lawsuit from labor union officials who wanted to eliminate the OPT program (Redden, 2019), that fortunately was recently struck down by a federal judge (Redden, 2021). This lawsuit demonstrates the fragility of the OPT program, which is vital to international student employment opportunities in the United States.

Research has shown that increased employment and immigration opportunities can lead to increased ISE both in the United States and in other countries (Ilieva, 2017), so it is quite possible that elimination of the OPT program would drastically reduce the number of international students who choose to study in the United States. A recent empirical analysis of the initial STEM OPT extension in 2008 found that the increased work authorization opportunity did lead to more students staying in the United States temporarily after graduation and taking advantage of the program (Demirci, 2019). Ilieva (2017) found that when political events occurred – whether terrorist attacks, immigration restrictions, or other related events – ISE was temporarily diverted to other countries. The next viable pathway for international students who

want to work in the United States is the H-1B non-immigrant visa, which can be even more challenging to obtain than OPT.

H-1B Visas

The H1-B work authorization visa, which can be used after OPT expires or directly after graduation, is not easy to navigate. Additionally, employees and employers have little influence on who is approved (Shih, 2016). This temporary nonimmigrant status is granted for three years, with a one-time extension for a maximum of six years (American Immigration Council [AIC], 2020). Added together with the STEM OPT extension, international students can potentially work in the United States for nine years before applying for permanent residency status. This pathway is complex for postgraduates to tread (Shih, 2016). The H-1B program was initiated in 1990 with an initial limit of 65,000 visas each year, and an extension of 20,000 for U.S. degree holders. As the international student numbers have grown, the immigration pipeline has shrunk because the H-1B cap has not increased, excluding 1999-2004 (AIC, 2000). Every year since 2000, the H-1B visa applications have exceeded 85,000, which triggers a lottery system of who is awarded the visa (AIC, 2020).

Contrary to some policymakers' objections that the H-1B visa program hurts American citizens, studies have shown that cities with high numbers of H-1B workers saw even greater wage growth for American citizens (AIC, 2020). Shih (2016) found that a decrease in the H-1B cap led to reduced international student numbers, particularly from countries like India that receive a disproportionate number of H-1B visas. Demirci (2019) found that students who utilized the STEM OPT extension were more likely to obtain an H-1B visa, tentatively showing that the increased employment time can provide postgraduates with more time to prove their professional value to their employer and USCIS. However, most H-1B visas go to immigrants

who did not complete an academic program in the United States. In 2010, only 35% of H-1B visas went to former international students (Ruiz, 2014).

Although the H-1B visa cap has not decreased recently, the filing process and costs have increased, and the process has become more complex and challenging for employers to navigate (AIC, 2020). These continual challenges and limited H-1B visa availability may discourage students from coming to study in the United States (Demirci, 2019; Shih, 2016). Although some legislators have proposed a pathway to permanent residency for international student graduates, this is unlikely in the current divided political climate. At a time when other countries are increasing their postgraduate employment opportunities and expanding immigration for highly skilled workers (Grimm, 2019; Sa & Sabzalieva, 2018), the United States is moving in the opposite direction (Redden, 2019).

Other Countries' Immigration Policies and International Student Enrollment

This section compares immigration policies and trends of three other top host countries: The United Kingdom (U.K.), Australia, and Canada. The United States has been the most popular host country for international students since data collection began (OECD, 2019). Nonetheless, the global proportion of international students that study in the United States has continued to decrease as other countries increase their HEI capacity, change their immigration policies, and develop stronger economies (Gribble, 2008; OECD, 2019). Part of the reason the United States has been able to enroll large numbers of students is its capacity. International students comprise less than 5% of the total college student population in the United States, but other popular host countries have much higher international to domestic student percentages (IIE, 2019; OECD, 2019). As of 2017, Canada had 11% ISE, the U.K had 19%, and Australia had 25 % (Sa & Sabzalieva, 2018). Additionally, as U.S. ISE recently declined, other

Anglophone and developed countries increased their ISE. In particular, Canada has seen exponential growth in recent years as the United States has experienced declines (OECD, 2019).

Globalization has ignited the debate of merit-based immigration and the reality that the United States needs more highly skilled immigrants to compete in a knowledge-based economy (Gesing & Glass, 2019; Ruiz, 2014). However, subversive political rhetoric and immigration policies have underscored this reality and made it more difficult to attract and retain highly skilled immigrants (Pottie-Sherman, 2018). The United States is unique in its immigration and visa policy because it is primarily structured around family reunification instead of merit and a point-based system (PBS), like virtually all other developed countries (Pottie-Sherman, 2013). The creation of the H-1B visa in 1990 and OPT in 1992 created steppingstones to residency and potential pathways for international students, but these programs' explicit goal is for temporary experiences (Grimm, 2019). Recent attempts to shutter or decrease the OPT and H-1B programs (Redden, 2019), as well as the 2020 ICE guidance that attempted to send students taking online courses to their home countries during a pandemic (Durkee, 2020), portray the United States as an unwelcome place to study.

On the contrary, other major receiving host countries have continued to open their borders and create more student visa and immigration pathways. Canada, in particular, offers a pathway to residency for international students that graduate from a Canadian HEI (Gribble, 2008). Canada's government even has a "Come to Canada" tool and detailed charts online that help students find the best pathway to work and remain in Canada (Government of Canada, n.d.). Australia moved from a family reunification immigration focus to a PBS in the 1990s, similar to the Canadian system. Australia offers a similar program to OPT called the Temporary Graduate Visa, allowing students to obtain enough points to qualify for permanent residency (Grimm,

2019). Although Australia has also struggled with the some of the same social and political backlash to immigrants in recent years as the United States, they have continued to welcome international students in a unified higher education recruitment policy, which has led to ISE as their third highest-grossing import service (Grimm, 2019). The U.K has experienced similar challenges to the United States due to Brexit and political tensions. They also lost a proportion of international student market share, although their ISE has continued to increase, even in recent years (Walsh, 2020). The U.K.'s PBS and ISE strategy has prioritized non-European Union (EU) students for international enrollment but prioritized EU residents in obtaining work visas after graduation (She & Wotherspoon, 2013). They plan to adjust their work visa policy to make it more accessible for international students after the 2020/21 academic year, reverting to the system in place before 2012 (Walsh, 2020). In an analysis of the different ISE and policy and policy influences of the four countries between 2000-2016, however, Sa and Sabzalieva (2018) found that the challenging policies did not prevent growth. Much has changed since 2016, and it remains to be seen how ISE in the United States will continue with the present obstacles.

Tuition Costs and Fees

While most international students can provide funding for their education through family and other personal means, many students are also frequently burdened by the cost of tuition (IIE, 2015; Krsmanovic & Sabina, 2020). There are mixed results in the literature about the impact of tuition rates on enrollment. Zhang (2007) found that tuition increases did not significantly impact student enrollment at U.S. HEIs, although the author did not examine international students. Bowman and Bastedo (2009) found that enrollment at liberal arts institutions increased when tuition increased, potentially serving as a proxy for quality. Another study found that tuition rates

did not significantly impact the enrollment of international students at a particular university (Chen et al., 2019).

The overall costs for attending college, including tuition, fees, room, and board, increased by 31% at public institutions and 24% at private institutions from 2007 to 2017 (NCES, 2017). Increased tuition coincided with an 85% growth in ISE (IIE, 2019). While the raw numbers indicate that increased tuition rates were not a deterrent for international students, the biggest increase in ISE came from students in higher-income countries like China (IIE, 2019). Only looking at an overall ISE growth does not consider the impact that increased tuition may have on graduate students or students from less-wealthy countries.

International students are frequently charged higher tuition rates and fees than domestic students and out-of-state students at public institutions (Krsmanovic & Sabina, 2020). A recent study by Krsmanovic and Sabina (2020) that examined 229 public HEIs found that 14% of HEIs charged higher tuition rates for international students than out-of-state students. They also found that on average, undergraduate international students paid almost $300 per semester in fees, and graduate international students paid $250. Several studies have examined whether increased international student numbers have coincided with decreased state appropriations or net tuition revenue, highlighting ISE's potential importance for financial stability at U.S. HEIs (Cantwell, 2015; Komissarova, 2020; Macrander, 2017a; Shen, 2016). Macrander (2017a) and Shen (2016) found that a decrease in state appropriations was significantly correlated with increased international student enrollment. Cantwell (2015) found that for some HEIs, more significant numbers of international students led to higher tuition revenues.

Although international students have continued to enroll at U.S. HEIs even with increased tuition costs, a report from the IIE (2015) found that 62% of international students

believe that U.S. HEIs are too expensive. The rising cost of tuition was also identified in another report as one of the main reasons that international students choose to study outside of the United States (International Trade Administration [ITA], 2016). International students are also unable to apply for loans or work off-campus to support themselves during school (USCIS, n.d.-b). As tuition continues to rise, visa challenges mount, and other countries grow the capacity and quality of their higher education systems, it is likely that the ISE in the United States will continue to decline. This study will examine whether tuition plays a role in ISE at individual institutions over 16 years, which is an understudied aspect of economic influencers on ISE.

Economic Opportunities in Cities and States

The United States is economically prosperous, but wealth and job opportunities are disproportionally located in individual states or urban areas (Ruiz, 2014). Worldwide, people are moving to urban areas to obtain better employment opportunities (United Nations [UN], 2018). By 2030, 60% of the world's population is projected to live in an urban area (UN, 2018). Little research has been conducted to determine if international students are influenced by the city's economic vitality, state, or region where their HEI is located. It is a logical to imagine that if international students are drawn to study in the United States because of economic potential, they may prefer to study in an economically prosperous state or city where they can build their human capital and networks for future job opportunities (Bourdieu, 1986; Ruiz, 2014). This connects to data that shows that students often chose to stay in the same metro area as their university to complete their OPT (Ruiz, 2014; Ruiz & Budiman, 2018). According to Ruiz and Budiman's analyses (2018), OPT graduate retentions ranged from 85% for the New York City metro area to 7% for the Springfield, IL area. In terms of attracting other international student graduates and retaining their own, the Seattle metro area topped the list with a 52 % growth in international

student graduates living in the area (Ruiz & Budiman, 2018). The top seven states with the largest international student populations in 2019 were also among the top ten states with the highest GDP, an indicator of economic vitality (BEA, 2020; IIE, 2019).

Two empirical studies explored how the economic vitality of a HEI's surrounding area affects ISE. Chen and colleagues (2019) did not find a significant effect of ISE's local unemployment rates over time, but they only examined one HEI. In a rare study that examined how state economic conditions might connect to net tuition growth and ISE, Komissarova (2020) found that states with better financial health enrolled more international students during the last 15 years. Although it is doubtful that international students directly consider the GDP and the state's economic stability, it connects to students' desire to obtain gainful employment upon graduation in the United States (Loo et al., 2017; Musumba et al., 2011).

Section Summary

This section discussed important immigration, economic, and employment factors that may influence or contribute to international students' choice to study in the United States. This included career resources at HEIs, visa challenges, OPT, H-1B visa, tuition and fees, and how economic opportunities in individual states or cities may connect to ISE. A discussion of other countries' immigration and postgraduate employment policies was also included to provide a global context. International students are increasingly focused on employment outcomes. The idea of paying exorbitant tuition fees with the unlikelihood of obtaining a job in the United States after graduation is not a viable long-term solution (Ammigan, 2019). The inaccessibility of the H-1B visa, the recent challenges of the OPT program, and the unregulated numbers of enrolled international students create a crowded pipeline where it becomes even more essential that international students are well prepared to obtain a job in the United States (Shih, 2016). To

advocate for changes in policies at the national and state levels, it is critical to understand how economic and employment factors contribute to international student enrollment. This research study will examine the connection between OPT and ISE, how ISE is related to tuition increases over time, and how ISE may connect to a HEI's state's economic conditions. The next section will discuss different aspects of geographical and spatial factors.

Geographical and Spatial Factors

The national context of a HEI is an important motivation for many students, and studies have found that students often choose a country before they even search for a specific HEI (Branco Oliveira & Soares, 2016; Dill & Soo, 2005; Marginson, 2006). Much empirical research has focused on the appeal of a specific host country, and general desirable institutional characteristics over the city, state, or other regional features. This study goes beyond the common focus of the nation in ISE research. It examines other layers of international students' decision-making process, including the state and city factors that are often interwoven with the HEI. This section discusses international student motivations related to the national, state, city, and institutional levels in the United States and how worldwide regional mobility is impacting ISE more broadly.

Importance of Location for International Students

A HEI's national location has proven to be one of the most foremost factors in the decision-making process for international students (Rafi, 2018). Most research studies have examined students' choices based on the host country. There is still much to discover about the flows of ISE beyond the national typography. Studies have shown that students prioritize the country before the institution, but the most academically minded students focus on the ranking and the institution before the national context (Branco Oliveira & Soares, 2016; Marginson,

2006). Students may often see the benefits of studying in a specific country available at most HEIs they could choose (Nicholls, 2018). The location of a student's tertiary education institution is a key factor in their decision-making process, even though it may not be as crucial as other factors like academic quality and employment opportunities (Rafi, 2018). Nicholls (2018) conducted a systematic literature review and found that the institution's location (beyond the national level) was infrequently listed as a primary reason for students selecting their particular institution. Rafi (2018) found that students considered the climate and geographic location after they determined the HEI to be highly ranked. The specific institutional location may have more influence on non-degree seeking, exchange students, as demonstrated by Gallarza and colleagues (2017) who examined study abroad students in Spain. Students who choose to study overseas for their full degree may not be as concerned with the institution's location beyond the national context, academic programs, and economic potential of the specific HEI (Marginson, 2006).

National Level Mobility

The United States has one of the most developed and extensive higher education systems in the world. However, many other national higher education systems like Singapore, the United Arab Emirates, and Malaysia have made significant progress in the last 30 years (Altbach & Knight, 2007; Kondakci et al., 2018). Although the United States welcomes the largest number of international students and has the largest capacity, a unified global student recruitment plan in the United States has not been prioritized like in many other countries (James-MacEachern, 2018). As discussed in earlier sections, international students that choose the United States do so primarily because of the academic reputation, institutional prestige, and economic opportunities (Mazzarol & Soutar, 2002; Nicholls, 2018). English as a medium of instruction is key to growth

in the international student market, exemplified by the student growth in English-speaking programs in non-English-speaking countries like China and Germany (OECD, 2019). International students are viewed as a way to bring prestige to one's university, increase the knowledge economy, and bring more revenue to the host country in general (Altbach & Knight, 2007; Delgado-Márquez et al., 2013). The United States has been able to rely on the demand and desire for its HEIs with ISE, so many institutions can benefit and receive international students without many strategies simply because they are located in the United States (Marginson, 2006).

Most empirical studies that examine international students' decision-making processes have considered the national level (Mazzarol & Soutar, 2002; Wei, 2013). One of the most commonly used frameworks for ISE, the Push-Pull theory, looks at what "pulls" a student to a particular country and "pushes" them from their home country (Altbach, 2004; Mazzarol & Soutar, 2002). This focuses solely on national characteristics. Other theories are similar in that they stipulate several steps: International students first have to decide that they want to obtain a credential abroad, then choose a country, then select an institution (Branco Oliveira & Soares, 2016). Bohman (2014) modified a common framework for the community college sector, which added a step for international students to decide the type of institution most suited for them. Multiple studies have shown that international students typically choose the country they want to study before choosing a particular institution (Marginson, 2006; Souto-Otero & Enders, 2017). UNESCO and OECD collect data on country-level mobility. Solely thinking in terms of national-level mobility misses the importance that global cities and regions play. There needs to be more research that moves beyond methodological nationalism and examines the role that embedded cities and states may play. Much research examines data that is easily quantified and available, which is aggregated by the nation. Other studies investigate students at one or two institutions to

determine why they selected that university (Chen et al., 2019; Nicholls, 2018; Urban & Palmer, 2016). The trends and decisions are often extrapolated to a national level, which may not accurately explain the phenomenon. This study will contribute to push back against methodological nationalism by examining the impact of the HEI's location on ISE, not solely defined by national characteristics.

Worldwide, more students are choosing to study closer to home, potentially due to cost, growing higher education capacity, or to be closer to family (Kondakci et al., 2018). Additionally, countries in the same region tend to have similar cultural and religious tendencies, which is a factor that influences students choosing a regional location (Ahmad et al., 2016; Perkins & Neumayer, 2014; Van Alebeek & Wilson, 2019). An institution's location may be even more important when students choose to stay closer to home or in the same region.

Worldwide Regional Mobility and Emerging Destinations

ISE has continued to diversify as more people study outside their borders, and as countries around the world develop greater higher education capacity (Perkins & Neumayer, 2014). Developed, mostly Western countries, were well-positioned to receive the largest numbers of international students in the 20th century, but the 21st century has ushered in the beginning of a new era in higher education (Altbach & Knight, 2007). Regional hubs appear to provide more affordable opportunities for students to gain an international perspective and aid in developing the host country. Students who choose regional hubs are not typically students who would choose to study in a Western country if they had the chance (Ahmad et al., 2016; Kondakci et al., 2018; Wilkins et al., 2012). They have different circumstances, goals, and characteristics, then traditional students who historically study abroad. This may include financial constraints or family concerns (Wilkins et al., 2012). Historical, political, and cultural

proximity are major pull factors to regional destinations, but they also have similar push factors from their home countries (Ahmad et al., 2016; Kondakci et al., 2018). Students are not typically pulled to the regional hub's destination country based on the academic performance, contrary to what is often seen for major receiving countries like the United States and the United Kingdom (Kondakci et al., 2018; Mazzarol & Soutar, 2002). Students who attend an international institution in their regional network tend to come from developing countries, while wealthier students, or students from developed countries, can afford to study in any location (Nicholls, 2018). The growth of regional mobility worldwide shows the importance of location and geographical factors on ISE and tertiary education.

Although Anglophone, developed countries top the list for international student destinations, historical and colonial legacies have provided a pipeline for many countries (Mazzarol & Soutar, 2002; OECD, 2019). This can be particularly pronounced when examining ISE from a regional level. Perkins and Neumayer (2014) found that a colonial linkage doubles international students' flow, while a common language increases the flow by four times. They discovered that colonial and language similarities were more important for international student choice than university quality (Perkins & Neumayer, 2014). As an example, almost 35% of Portugal's international students come from Brazil, which is a former colony of Portugal and is Portuguese speaking. An additional 13% come from Angola, a former Portuguese colony (UNESCO, 2020) Cairns and Sargsyan (2019) found that Armenian students were attracted to study in specific countries with large Armenian diasporas. Other studies have found that trade and political linkages can impact international student rates (Mazzarol & Soutar, 2002; McMahon, 1992; Wei, 2013).

Students' flow from developing to developed countries, in line with the WST utilized in this study, has summarized and explained the vast majority of ISE flows until the last few decades (Kondakci et al., 2018). ISE has diversified and proliferated due to political tensions shifting, the growth of higher education institutions in developing countries, and intentional immigration and visa policies to welcome international students (Kondakci et al., 2018). Wei (2013) found that traditional destinations were still dominant, but that other locations were more attractive for international students. As the worldwide wealth disparity decreases between different countries, the historical, colonial, and language linkages may provide a more important rationale for students. Suppose students can receive a good education and economic benefits in countries where they share a common culture. In that case, more students may choose to study in similar locations or close to home (Kondakci et al., 2018). More research is being conducted about ISE regionally, but there is still much unknown about the importance that international students place on U.S. states or cities.

State Level Mobility

Examining ISE through the lens of a particular U.S. state is not commonly seen or discussed within the academic literature. A notable exception is Nicholls (2018) who examined Michigan State University students' decision to study in Michigan. Participants listed the factors unique to the state of Michigan or the campus location among the least important factors in their decisions. However, they did prioritize the safety and security of Michigan over other state-level factors (Nicholls, 2018). Domestic undergraduate students seemed to be more impacted by the campus and the surrounding area than international students. However, it may be the case that students are not aware of how the state they choose connects to their HEI choice. This could tie into the state's economic vitality and the increased job opportunities if students build

connections in a well-resourced state. A recent study examined how state-level economic conditions connected to ISE and found that states with healthier economies enrolled more international students (Komissarova, 2020).

Although research is sparse that connects the state location with international students' decisions, few noteworthy studies examine the choices of out-of-state domestic students, which may parallel international students' motivations (González Canché, 2018; Zhang, 2007). Similar to how 61% of international students attended a doctoral, research-intensive university from 2008 to 2012 (IIE, 2019; Ruiz, 2014), 66% of out-of-state domestic students enrolled at doctoral research institutions, while only five percent enrolled at baccalaureate institutions (Zhang, 2007). Well-resourced international students are usually better able to travel further for college, consistent with how out-of-state students typically have the financial means to support moving further away from home (González Canché, 2018).

At face level, it seems that individual states in the United States are more attractive to international students. The largest international student populations in the United States reside in immigrant and international-populated states like Texas, Florida, California, and New York (IIE, 2019; Yao & Tong, 2018). These states have also experienced the greatest international student growth in the last decade, suggesting that student numbers may compound for further development (Yao & Tong, 2018). More empirical analysis is warranted to understand how the state may connect to ISE.

City-Level Mobility

There is scarce empirical research regarding a city or urban area's impact on international students' decision-making. In today's globalized world, it is not hard to imagine that a city's geographic importance could bypass the national context for a prospective international student,

where cities become more important than the country. For example, students may want to study in a cosmopolitan city, be it New York, Hong Kong, or London. The United States in particular, is not a unified labor or higher education market. Rather, it is better defined by the hundreds of metro areas that have distinctive economic and educational characteristics (Ruiz, 2014).

Cubillo, Sánchez, and Cerviño (2006) listed the city as one of the significant factors in students' motivations to obtain a credential abroad, after the personal decision to study overseas and the country. The researchers theorized that the safety, cost of living, social activities, and the international environment could be important (Cubillo et al., 2006). Although Yao and Tong (2018) examined IIE state data, their Global Information Systems map showed the top five institutions in each state that enrolled international students were skewed toward urban areas and cities, suggesting that it is instead the metropolitan area rather than the state that attracts students. The United States is unique because of each state's ability to govern its affairs and set their policies to a large extent. The state where a city is located does impact the way the city is governed and likely perceived as well. Therefore, a particular city's state may be more critical in the United States than in other countries.

Much of the research about international students and urban areas relates to how students make their home and find attachment in their new environment (Prazeres, 2018). One study found that students identify their host city as a place of belonging rather than the actual country (Prazeres, 2018). International students appreciate a multicultural and international environment where they can meet like-minded people (Ammigan, 2019), which may be more likely to occur in urban areas with more diverse populations. Relatedly, one study found that urban community colleges enroll higher numbers of international students and have a higher commitment to internationalization (Bègin-Caouette, 2013). In urban development literature, a study discussed

the increased *studentification* of a city with many international students. *Studentification* is the student population's effect on an urban area, particularly around a college (Malet Calvo, 2018). Other urban areas have likely experienced similar transformations with international student enrollments' large growth in the first half of the 2010s (IIE, 2019).

The Brookings Institution has focused on the importance of Global Cities in one of its recent initiatives to equip metropolitan leaders with the information, policy implications, and data to better position themselves globally (Ruiz, 2014). Ruiz's 2014 report emphasized the role that HEIs in cities play in enrolling international students. He found that from 2008 to 2012, 85% of international students attended a HEI in one of 118 cities, with a third of those students concentrated in only ten different cities (Ruiz, 2014). In the same five-year period, smaller cities experienced the fastest international student growth and had some of the highest percentages of international to domestic student ratios. Although several large land-grant institutions appeared on the list of cities with the highest international student populations due to their large numbers of international students, cities with multiple HEIs where international students could enroll had higher ISE overall (Ruiz, 2014). This report by Ruiz (2014) provides some of the only research about international students studying in metropolitan areas in the United States. This study will use the campus setting as a control variable, categorizing a HEI based on its urban location.

Institutional Level

This section has covered various geographical and spatial levels that affect ISE, be it at the national, state, city, or worldwide regional level. Discussing the institutional level is nuanced because a HEI is both autonomous from its physical location (city, state, and nation) and embedded in its area's culture and economy. In theory, the same academic programs, faculty, student services, and research could occur in New York City or small-town Nevada. However,

HEIs both simultaneously shape and are shaped by their surroundings. Even though the influence of a HEI's location may be better explained by the city, state, or country, it is important to discuss the influence of a HEI's unique offerings because it is an important aspect of international students' decision making.

Academic quality, often conceptualized by ranking, is one crucial institutional factor discussed in-depth earlier in this chapter. A highly ranked HEI in the United States has a major advantage in international student recruitment because many international students prioritize the institution's ranking over other significant factors (Branco Oliveira & Soares, 2016). In general, HEIs in the United States are presumed to have a higher academic standard, but the ranking helps students to differentiate between hundreds of HEIs (Bowman & Bastedo, 2009). Several other studies have looked at the impact of institutional factors on international students' decision-making. At the institutional level, the focus is often on the facilities' quality and the faculty (Ammigan, 2019; Nicholls, 2018). One study found that international students were the most satisfied with HEIs that had a strong multicultural classroom environment, which speaks to the idea that the HEI's internationalization might impact ISE and the students' experience (Ammigan, 2019).

Alfattal (2017) conducted a study that focused on the most important institutional aspects to international students that differed from domestic students. He found that academic program, affordability, and reputation were the top three choices of international students that corresponded to the specific HEI. Nicholls (2018) also conducted a large-scale survey study at one doctoral HEI with a large international student population and found that the reputation of the degree program and the university's overall reputation were the most important. Van Alebeek and Wilson (2019) examined international student choice through a qualitative study and found

that the HEI reputation and study program were critical in helping students choose their HEI. Many of the leading institutional factors that matter to international students relate to the quality of the academic programs and the overall university. However, it does vary based on each student. There are several institutional characteristics that I used for control variables in this study, including the HEI Carnegie classification and student population.

Section Summary

International students' focus on location for their HEI decision is an unevenly studied phenomenon. Much attention has been paid to the importance of the host country, but the city and state-level remain underdeveloped. Institutional characteristics are incredibly important and often distinct from its embedded location. This section discussed literature surrounding national, city, state, and institutional mobility motivations, the overall importance that students place on location, and how worldwide regional mobility is slightly shifting the patterns and flows of ISE.

Chapter Summary

The literature reviewed in this chapter has demonstrated a complex array of characteristics and factors that influence international students' decision to study in the United States. In particular, this chapter focused on the importance of institutional prestige, immigration, employment, economic factors, and geographical and spatial factors. World-systems theory provided a rationale for the overall focus on ISE in the United States. Additionally, human capital theory highlighted the individual motivations that international students might have when enrolling at a U.S. HEI. ISE in the United States has increased and changed in the last 20 years, making the time-series and longitudinal analysis of this study critical for understanding the impact of the selected variables. Recent ISE declines and immigration challenges are converging as HEIs combat challenges due to COVID-19. This study should prove timely and helpful for

higher education administrators and policymakers to understand better how institutional positioning and characteristics impact ISE.

CHAPTER III

METHODOLOGY

This research study focused on how postgraduate employment, tuition, economic conditions, and ranking related to ISE in the United States from 2008 to 2019. This chapter describes the methodology used, including the purpose, study importance, and research questions. I also discuss the context, datasets, variables, data collection, and data analysis procedures. The chapter concludes with a discussion of the limitations of the study.

Purpose

The purpose of this study was to examine the extent to which tuition, Optional Practical Training (OPT), unemployment rates, Gross Domestic Product (GDP), and *US News and World Report* (USNWR) ranking connect to ISE at higher education institutions (HEIs) in the United States, by examining data from 2004 to 2019 differentiated based on institutional type. This study built on previous research studies that have examined major factors for international students' decision-making process of selecting a tertiary education institution (Alfattal, 2017; McMahon, 2013; Wei, 2013). However, the current study went further than other studies by comprehensively examining secondary data to understand how ISE may be influenced by academic and economic factors at the institutional level. Previous studies have examined how institutional ranking may impact enrollment and how students use rankings as a heuristic for their decisions, but very few studies have examined the impact that ranking has on ISE (Bowman & Bastedo, 2009; Branco Oliveira & Soares, 2016). Postgraduate employment, or more specifically OPT, has not been examined as a potential predictor of ISE to better understand how employment rates may influence international student institutional choice. Research about the influence of tuition rates on student enrollment has been primarily focused on domestic students.

Finally, this research study also examines most of the predictors over 12 years, which provides a better understanding of how these factors may have changed over time. Due to the lagged nature of the time series analysis, 16 years of data yields 12 years of analyses.

Within the 2003/2004 to 2018/2019 analysis time frame, many events and circumstances impacted ISE in the United States. For the first few years examined in this study, ISE was likely affected by post 9/11 issues, including increased immigration controls, fewer H-1B visa issuances, political rhetoric, and shifting demographics (Choudaha, 2017; Urias & Yeakey, 2009). ISE expanded exponentially in a post-recession world after 2009 - when the STEM OPT extension began and decreased state appropriations led to more international students' recruitment and enrollment (Demirci, 2019; Macrander, 2017a). Rising nationalism, visa and immigration issues, increased tuition, and the recent presidential administration has influenced trends since 2016 as ISE numbers have declined (Choudaha; 2017; Pottie-Sherman, 2018). Other factors like worldwide competition and expanding regional mobility have continued to impact ISE in the United States throughout the 16 examined years in this study (Kondakci et al., 2018. The results from this study should help higher education professionals understand how their institution may fare in the future and how to engage with international students, and aid policymakers in understanding how immigration policies and state economic vitality impacts ISE.

Research Questions and Hypotheses

The following research questions and hypotheses guided the study:

- RQ1: How does international student enrollment at U.S. higher education institutions relate to ranking, tuition, GDP, and the unemployment rate from 2008 to 2019?
    - H_a1: *USNWR* ranking and ISE will have a positive relationship.

  - H_0 2: Tuition rates will not have a statistically significant effect on ISE.
  - H_a 3: GDP and ISE will have a positive relationship.
  - H_a 4: ISE and unemployment rates will have a negative relationship
- RQ2: How does international student enrollment at U.S. higher education institutions relate to ranking, tuition, GDP, and the unemployment rate from 2008 to 2019 when differentiated by Carnegie classification?
  - H_a 6: Ranking will be a significant predictor for CC1.
  - H_a 7: Tuition will be a significant predictor for CC1.
  - H_a 8: GDP will be a significant predictor for CC3 and CC4.
  - H_a 9: Unemployment rate will be a significant predictor for CC3 and CC4.
- RQ3: How does international student enrollment at U.S. higher education institutions relate to ranking, Optional Practical Training rates, tuition, GDP, and the unemployment rate in 2019?
  - H_a1: *USNWR* ranking and ISE will have a positive relationship.
  - H_0 2: Tuition rates will not have a statistically significant effect on ISE.
  - H_a 3: GDP and ISE will have a positive relationship.
  - H_a 4: ISE and unemployment rates will have a negative relationship
  - H_a 5: OPT and ISE will have a strong positive relationship.
- RQ4: How does international student enrollment at U.S. higher education institutions relate to ranking, Optional Practical Training rates, tuition, GDP, and the unemployment rate in 2019 when differentiated by Carnegie classification?
  - H_a 6: Ranking will be a significant predictor for CC1.
  - H_a 7: Tuition will be a significant predictor for CC1.

- H_a 8: GDP will be a significant predictor for CC3 and CC4.
- H_a 9: Unemployment rate will be a significant predictor for CC3 and CC4.
- H_a 10: OPT will be a highly significant predictor for CC1 and CC2.

Rationale for Hypotheses

Each hypothesis was developed based on previous research studies and the theoretical frameworks discussed in Chapter Two and briefly in this chapter. H_a1 and H_a6, which examined the effect of USNWR ranking on ISE, were based on research findings that international students prioritize rankings and make a significant investment to increase their human capital, which is thought to be more substantial at higher-ranked institutions (Souto-Otero & Enders, 2017). In line with the world-systems theory (WST), prestigious and highly rated HEIs tend to control the flow of knowledge production, have the best infrastructure, employ the most highly qualified staff, and lead globally in research and development (Macrander, 2017b; Marginson, 2006). Based on the preponderance of research that examines the importance of ranking for the most prestigious universities, I predict that ranking will only be a significant predictor for Research 1 institutions, which tend to be highly ranked (Bowman & Bastedo, 2009; Souto-Otero & Enders, 2017).

H_0 2 was the only hypothesis where I did not suggest a significant relationship between the variables, but I did suggest in H_a 7 that tuition would be a significant predictor for CC1 (Very High Research Activity Doctoral Institutions). There are conflicting findings in previous research studies about rising tuition costs and enrollment. International students often cite their financial challenges as a burden when studying in the United States (IIE, 2015; ITA, 2016). Studies that examined out-of-state domestic students found no relationship between increased tuition and enrollment (Zhang, 2007) and other studies have examined how ISE rose as state appropriations

declined and tuition and fees increased (Cantwell, 2015; Macrander, 2017a; Shen, 2016). In line with the WST, HEIs with higher costs may offer more human capital growth opportunities. This thought is postulated in Bowman and Bastedo's 2009 paper, which found that enrollment increased when liberal arts colleges' tuition increased. With conflicting ideas and research, I believe that there will likely be no significant relationship between ISE and tuition overall, but that there will be a significant correlation for Very High Research Activity Doctoral Institutions (CC1).

H_a 3, H_a 4, H_a 8, and H_a 9, which examine GDP and the unemployment rate, are connected to the literature, WST, and human capital theory based on the importance that international students place on their degree (Pham et al., 2019; Wallerstein, 2004). Students are likely drawn to states and cities that have strong economic statures. They can then build their networks during college in a place where they will have job prospects and connections upon graduation (Ruiz, 2014). Although there is no research about how economic conditions correspond with students' motivations to attend different types of institutions, I predict that the economy of the surrounding area will be more important for non-doctoral institutions. This is because doctoral institutions tends to be higher ranked, and have other factors that are appealing to students, as described in the other hypotheses.

H_a 5 and H_a 10, which refers to OPT's influence on ISE, is based on the increasing importance that international students place on finding a job and employability (Loo et al., 2017). The majority of students that use OPT are in STEM fields (IIE, 2019), and there has been a dramatic increase in ISE since the STEM OPT legislation was enacted in 2008 (USCIS, n.d.-b). Even now, as new international student numbers decline, numbers of STEM OPT students have contributed to the perception that student numbers are not dropping based on data from IIE (IIE,

2020c). International students prioritize the United States' economic and employability opportunities (Han et al., 2015), so HEIs that have larger numbers of students utilizing OPT should see increases in their ISE. Student utilization of the OPT STEM extension continued to grow alongside ISE's growth from 2008 to 2016 (Grimm, 2019; IIE, 2019), which contributes to the hypothesis that OPT and ISE are strongly related. The WST aligns with the idea that international students will be drawn to attend a particular HEI with substantial resources and economic potential (Wallerstein, 2004). Since doctoral institutions enroll large numbers of STEM students (IIE, 2019), I believe that OPT will be a significant predictor for doctoral institutions (CC1 and CC2), as opposed to non-doctoral institutions (CC3 and CC4).

The hypotheses and variables are related to international students' economic motivations and rationales, whether it is measured by USNWR ranking, OPT, tuition, or economic conditions. Previous empirical studies and theories provide a strong basis for the research questions and hypotheses.

Research Design

This quantitative study was an *ex post facto* design, using existing data from multiple organizations to answer the research questions. *Ex post facto* studies are an alternative to experimental designs to measure independent variables' potential effects (Leedy & Omrod, 2019). For this study, data that were already collected were used and combined in a unique dataset to answer the research questions. *Ex post facto* research design is common in educational and social sciences research and examines variables that are already present and cannot be introduced solely for the study (Leedy & Omrod, 2019). Since this study examines how multiple factors impact ISE over time, the use of existing data was an appropriate method to achieve the study goals.

Two research questions were examined using data from 2004 to 2019 to understand how international student mobility and enrollment have been influenced by tuition, postgraduate employment, economic factors, and institutional ranking for 12 years. The lagged nature of the time series model meant that 16 years of data yielded 12 years of analysis about ISE. Several important events, trends, and circumstances have impacted ISE in the United States from 2004 to 2019 (Choudaha, 2017). This includes post-9/11 recovery, the recession of 2008/2009, exponential college tuition increases, rapid international student growth, presidential administration changes, and increased immigration restrictions (Choudaha, 2017; Macrander, 2017a). The other two research questions were answered using data from the 2018/2019 academic year.

Using existing data from reputable organizations allows researchers to examine broader trends and the potential interaction of many factors that would be virtually impossible to understand through primary data collection (Smith, 2008). As a result, this study has more depth than the context of one or two institutions. It examined trends in some of the significant ISE factors over the past 16 years when major events have influenced higher education institutional vitality and growth.

Background and Context

The United States is the top recipient of international students, numbering 872,214 students in 2018/19 (IIE, 2019). Not including the 2020/2021 academic year, enrollment of new international students declined by 10% since the all-time high in the 2016/17 academic year (IIE, 2019), which scholars and practitioners alike have been quick to point to reasons like negative discourse, immigration restrictions, rising tuition, and other detractors (Pottie-Sherman, 2018). More research needs to be conducted, however, to understand how certain factors that impact

ISE may manifest at different institutional and state levels. With thousands of HEIs and a rapidly changing globally mobile student population (IIE, 2019; OECD, 2019), the United States is a dynamic location to study the impact of ranking, postgraduate employment, tuition, and economic conditions on ISE.

Theoretical Foundations

This study utilizes the WST to provide a framework for the research collection and analysis. The WST conceptualizes and explains the flow of capital and human labor in the globalized economy (Wallerstein, 2004). It hypothesizes that the world economic landscape is structured primarily by wealthier, developed countries extracting labor, commodities, and goods from lesser developed countries. This contributes to an unequal relationship where wealthy countries aggregate and accumulate wealth often at the expense of other countries (Wallerstein, 2004). This is demonstrated in higher education by the large number of international students that study in the United States from developing nations. The WST can help to explain why the predictors may affect ISE. Additionally, human capital theory can explain international students' rationales for choosing to study in the United States. Students often study in the United States to increase their networks by building connections with fellow students and alumni of a prestigious HEI. These networks and HEI name recognition can provide a broader range of economic and job benefits found in a prosperous country (Becker, 1993; Bourdieu, 1986; Pham et al., 2019). The theoretical frameworks are discussed in greater detail in Chapter Two.

Variables

There were five predictors, one outcome variable, one grouping variable, and seven control variables used to answer the individual research questions. OPT was only used in RQ3 and RQ4, and CC was used as a control variable in RQ1 and RQ3, but as a grouping variable for

RQ2 and RQ4. In this section, I discuss the different variables and details of the datasets. Table 1 explains important information about the variables and how they are operationalized. Most variables have unique data from 2004 to 2019, except the three fixed effect control variables which were not able to be used in RQs 1 and 2 due to the time series regression analysis technique.

Table 1

Description of Variables and Datasets

Variable	Measurement	Data Source	Dataset	Variable Type	RQs Used
Outcome					
International Student Enrollment	International Student Numbers by HEIs	National Center for Education Statistics	IPEDS 12-Month Enrollment	Continuous	All
Predictor					
Postgraduate Employment	Optional Practical Training Numbers	Immigration and Customs Enforcement	OPT Data	Continuous	3,4
Economic Indicator	Unemployment Rate	US Bureau of Labor Statistics	Average State Yearly Unemployment Rates	Continuous	All
Economic Indicator	State Gross Domestic Product (GDP)	US Bureau of Economic Analysis	Average State Yearly GDP rates	Continuous	All
Ranking	Ranking Lists	U.S. News and World Report	National and Regional University and College Rankings	Continuous	All

Table 1 (continued)

Tuition	Undergraduate/Graduate, Out-of-State Tuition (Public); Undergraduate/Graduate tuition (Private)	National Center for Education Statistics	IPEDS Student Charges for Full Academic Year	Continuous	All
Grouping					
Institutional Type	Carnegie Classifications – Four Groups	National Center for Education Statistics	IPEDS Institutional Characteristics	Categorical	2,4
Control					
Institutional Type	Carnegie Classifications – Four Groups	National Center for Education Statistics	IPEDS Institutional Characteristics	Categorical	1,3
Student Population	Number of students at HEI	National Center for Education Statistics	IPEDS 12-Month Enrollment	Continuous	All
Graduate Student Population	Numbers of graduate students at HEI	National Center for Education Statistics	IPEDS 12-Month Enrollment	Continuous	All
STEM Degrees Awarded	Number of STEM degrees awarded at HEI	National Center for Education Statistics	IPEDS Completions	Continuous	All

Institutional Funding Type	Private or Public	National Center for Education Statistics	IPEDS Institutional Characteristics	Categorical	3,4
Campus setting	Urban, Suburban, Rural, or Town	National Center for Education Statistics	IPEDS Institutional Characteristics	Categorical	3,4
State	U.S. State	National Center for Education Statistics	IPEDS Institutional Characteristics	Categorical	3,4

Outcome Variable

ISE data was differentiated by individual HEIs and provided by IPEDS (U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary System [IPEDS], 2004-2019). IPEDS classifies an international student as a *nonresident alien,* which is defined as "a person who is not a citizen or national of the United States and who is in this country on a visa or temporary basis and does not have the right to remain indefinitely" (NCES, n.d.-c, Nonresident alien section). One limitation of the IPEDS data is that DACA students are often reported in the *nonresident alien* category, which is the same as international students. IPEDS actually recommends reporting DACA students under the *nonresident alien* category. Non-DACA undocumented students may be reported as *Race/ethnicity unknown*. (NCES, n.d.-d). Undocumented students studying at HEIs are estimated to currently number 450,000, with about 20% of those estimated to be eligible for DACA (Feldblum et al., 2020). Unfortunately, it is not possible to determine if a student in the IPEDS *nonresident alien* category in each HEI is a DACA or international student. Nonetheless, IPEDS data was still determined to be the most accurate and accessible source of international student data for this study.

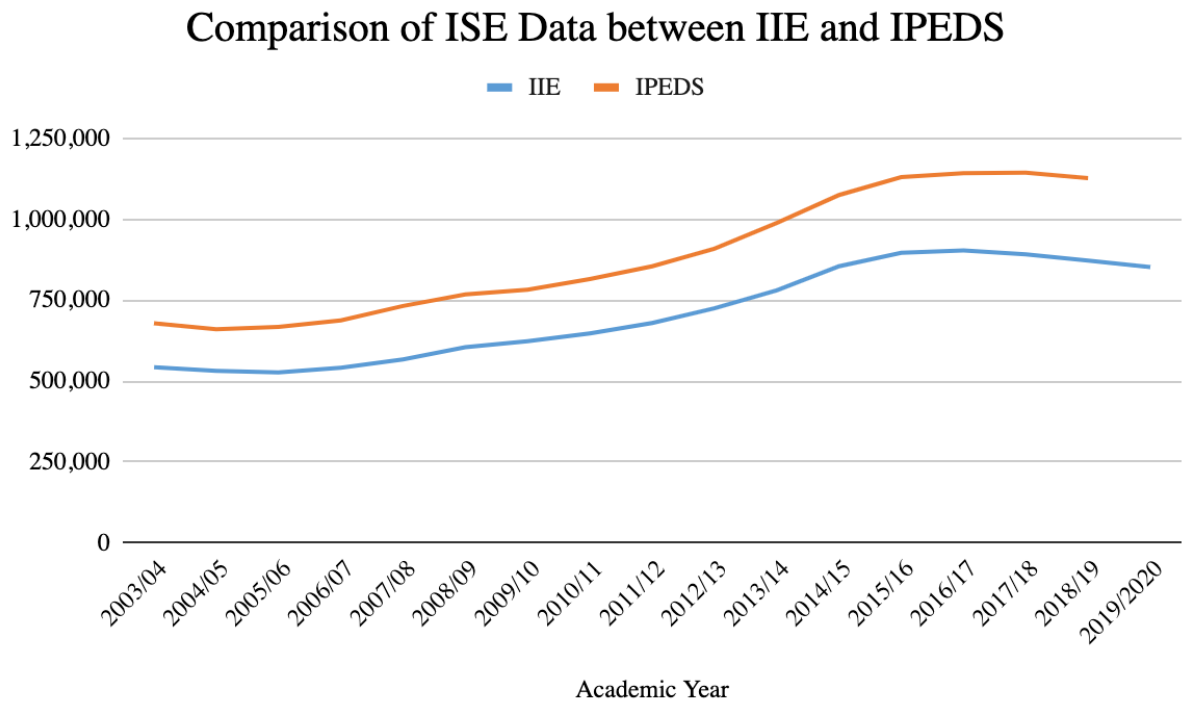
Two other data sources were considered to measure the outcome variable, which included data from Immigration and Customs Enforcement (ICE) or the Institute of International Education (IIE). The federal agency ICE collects data on all students studying on a non-immigrant student visa, including F-1, J-1, and M-1 visas. Those are the most common visas that international students hold who study in the United States (US Citizenship and Immigration Services [USCIS], n.d.-a). I submitted a Freedom of Information Act (FOIA) request in July 2020 for all international student visa holder data from 2004-2019 but was not provided the data in a timely manner to use it for this study. ICE has aggregate data based on students' citizenship

for the past three years on their website, but they include students who have graduated and are utilizing OPT in their overall numbers (ICE, n.d.)

I also considered using the IIE *Open Doors* data, which includes all accredited HEIs that enroll at least ten international students and respond to their survey. IIE surveys approximately 3,000 accredited U.S. institutions to collect data about enrolled international students, students studying abroad, and international scholars. The *Open Doors* report has collected data on international students since 1919, and their first report was published in 1954 (IIE, 2020b). *Open Doors* data have been used in many empirical studies about international students in the United States (Alfattal, 2017; Rafi, 2018), but it is rife with limitations. They do not survey all HEIs, and many institutions do not respond to their survey, including larger percentages of community colleges. For their 2020 *Open Doors* survey, only 57% (n = 1,666) reported their ISE, and IIE further estimated ISE for 14% of HEIs based on prior year estimates who did not respond. They also only report HEIs that enroll ten or more international students, and they also include students on OPT in their student numbers, which are students who have graduated and are no longer enrolled in their HEI. For these reasons, I determined that the IPEDS data would the soundest data to use to represent ISE. Figure 4 shows the difference in IPEDS and IIE ISE data during the 2003/2004 – 2018/2019 analysis period.

Figure 4

International Student Enrollment Data Differences between the Institution of International Education and the Integrated Postsecondary Education Data Statistics



IIE reported an average of 20.92% fewer international students in their reports compared to ISE. However, ISE overall data and trends throughout this dissertation typically refers to IIE data, because they regularly publish aggregate ISE data which is not the case for IPEDS specific to international students. Even considering the inclusion of some DACA students in the IPEDS data, it is clear that IPEDS is a more accurate and reliable data source.

Table 2 shows the top 20 HEIs for ISE (NCES, 2020), which are mostly doctoral-granting institutions.

Table 2

Top 20 Higher Education Institutions Hosting International Students in 2018/2019

Rank	Institution	City	State	ISE
1	New York University	New York	NY	15,992
2	University of Southern California	Los Angeles	CA	12,632
3	University of Illinois - Urbana-Champaign	Champaign	IL	12,140
4	Columbia University	New York	NY	11,993
5	Boston University	Boston	MA	10,539
6	Brigham Young University	Salt Lake City	ID	10,390
7	Harvard University	Cambridge	MA	10,361
8	Georgia Institute of Technology	Atlanta	GA	9,573
9	Purdue University - West Lafayette	West Lafayette	IN	9,446
10	University of California - San Diego	La Jolla	CA	9,334
11	Northeastern University - Boston	Boston	MA	9,012
12	Arizona State University - Tempe	Tempe	AZ	8,955
13	Campbellsville University	Campbellsville	KY	8,739
14	Pennsylvania State University - University Park	University Park	PA	8,426
15	University of Washington	Seattle	WA	8,295
16	University of California - Berkeley	Berkeley	CA	7,921
17	Houston Community College	Houston	TX	7,563
18	University of California - Davis	Davis	CA	7,466
19	University of California - Los Angeles	Los Angeles	CA	7,383
20	University of Wisconsin-Madison	Madison	WI	7,378

Note. Data from IPEDS (NCES, 2020).

Predictor Variables

There are five predictor variables examined in this study, which includes *USNWR* ranking, OPT, tuition, the unemployment rate, and GDP.

Ranking

HEI ranking was determined by the *U.S. News and World Report* magazine (USNWR), which has compiled a national HEI ranking each year since 1983 (Hazelkorn, 2014). Since this

study is limited to the United States, I used a nationally based organization. USNWR continues to be the most influential ranking system in the United States, and they have refined and updated their formula based on how the field has evolved (Dill & Soo, 2005; Morse et al., 2019). Domestic and international students widely utilize USNWR to search for viable HEIs (Bowman & Bastedo, 2009). USNWR determines their ranking through a formula that includes retention rates, graduation rates, social mobility, faculty resources, expert opinion, financial resources, high school academic standing, SAT/ACT scores, and alumni giving (Morse et al., 2019). Although there are other college rankings publishers like *Forbes, Niche, Princeton Review,* and *the Wall Street Journal,* the USNWR is thought to be the most utilized, and they update their ranking methodology to reflect the current times (Dill & Soo, 2005; Morse et al., 2019; Volkwein & Sweitzer, 2006).

The USNWR "Best National Colleges", "Best National Universities", and "Best Regional Colleges and Universities*"* rankings lists were used for all examined years. Collectively these are also known as the *U.S. News Best Colleges*. They also rank HEIs based on other characteristics or programs, such as the Historically Black Colleges, Business Programs, Engineering Programs, Online Degrees, Social Mobility, Study Abroad, and Best Value (Morse et al., 2019). In 2020, they surveyed 1900 HEIs, and 1400 are ranked and appear on the national or regional colleges and universities list (Morse et al., 2019). USNWR does not include community colleges, highly specialized institutions, or non-accredited institutions in their calculations, but community colleges and highly specialized institutions are included in my overall dataset.

The rankings from 2005 to 2020 were used because rankings are released the year before the titled year and based on prior data. For example, the 2020 rankings were released in September of 2019, and were based on data from 2018 and 2019. Therefore, the 2020 rankings

will align most closely to 2018/2019 data for the other variables. USNWR does not report or provide their ranking data online besides the current year, so I obtained years 2005 to 2019 through purchasing old magazines and utilizing one online dataset provided by another scholar (Reiter, 2020; USNWR, 2004; 2005; 2006; 2007; 2008; 2009; 2010; 2011; 2012; 2013; 2014; 2015; 2016; 2017; 2018; 2019).

Ranking was initially categorized, and then was analyzed as a continuous variable for the purposes of this study and for ease in interpretation. USNWR typically ranks the top 75-80% of HEIs individually in each list, which they consider Tier One. HEIs in Tier Two generally are the bottom 20-25% (USNWR, 2020). Additionally, some schools are tied and have the same ranking. USNWR has two tiers in each ranking list, but I made slightly different categories for this study. This was based on research that further differentiates HEIs based on high ranking (Bowman & Bastedo, 2009), and how HEIs also use regional rankings to advertise and differentiate themselves (James-MacEachern, 2018). Table 3 shows how the HEIs were categorized according to their order on the national or regional lists. The number of HEIs in each ranking list and tier varied each year, but the first two categories are typically close to about 50 HEIs each from the nationally ranked college and university lists. If a school was not ranked by USNWR either for one year or at all (such as community colleges), it was categorized as an unranked HEI.

Table 3

U.S. News and World Report Ranking Categorization

Category	Rankings List	Ranking Group	2020 Ranking (used for 2018/2019)
6	Best National Universities & Colleges	1-50	104
5	Best National Universities & Colleges	51-100	98
4	Best National Universities & Colleges	Rest of Tier 1	244
3	Best National Universities & Colleges	Tier 2	130
2	Regional Universities & Colleges (North, South, Midwest, West)	All ranked HEIs	764
1	No ranking	Unranked HEIs	1,544

There are many criticisms of rankings systems, including the focus on expert opinion, the lack of connection to students' learning, and their contribution to academic capitalism and neoliberalism (Bowman & Bastedo, 2009; Campbell et al., 2009; Marginson, 2006). Although rankings are an inherently flawed mechanism of measuring academic quality, they were used for this study due to the priority that international students place on rankings (Branco Oliveira & Soares, 2016). Rankings also measure important indicators that often predict or facilitate student success, like high school GPA, an HEI's faculty and financial resources, retention rates, and graduation rates (Marginson, 2006; Morse et al., 2019). Academic quality is one of the main factors that draws international students to the United States, so ranking was an important variable to include in this study (Alfattal, 2017; McMahon, 1992).

Postgraduate Employment

Postgraduate employment was measured by OPT data provided by the Student Exchange and Visitor Program (SEVP), which is a part of the ICE. OPT is a one to three-year employment opportunity that international students can utilize after graduating from a college or university in the United States (USCIS, n.d.-b). Although there are other sponsorship options for international students after they graduate from a U.S. HEI, OPT is used for most students to work in the United States. OPT is processed through the students' HEI, and international student advisors maintain the students' immigration status at their former HEI. OPT is not always easy to obtain, and many new regulations hinder students from quickly getting a job after graduation (Pottie-Sherman, 2018; Redden, 2019).

OPT data for 2019 were obtained through an ICE FOIA, which provided numbers broken down by institution, the field of study, academic status, nationality, and gender (ICE, 2020). Data for 2017 and 2018 were requested through an additional FOIA request, which was not fulfilled by the time of data analysis. Data from 2004 to 2016 were freely available through their website, but the data were not standardized nor comprehensive, so it could not be used. In 2019, 2,168 colleges and universities had at least one student on OPT. The SEVP data includes specialized colleges and universities, unlike the USNWR ranking data. In total, 205, 660 students used their OPT authorization in the 2018/2019 year. Since SEVP's dataset includes for-profit institutions, more HEIs are included in the OPT FOIA dataset than were analyzed for this study. Eight percent (n = 186) of schools had only one OPT student, and approximately 31% of schools (n= 664) had less than ten students on OPT. Table 4 outlines the central demographic data of students who utilized OPT in 2019 (equivalent to the 2018/2019 academic year), with the top ten recipients for HEI, country of citizenship, and field of study. It is noteworthy that many of the

same HEIs on the top ten OPT list are also on the overall ISE top list (Table 2), but there are differences. For example, The University of Texas at Dallas and Arlington are on the OPT top ten list but are not in the top 20 for overall ISE.

Table 4

2019 Optional Practical Training Demographic Data (Top 10)

Category	Number of Students	% of total OPT
Higher Education Institution		
Columbia University in the City of New York	4,596	0.91
Northeastern University	4,506	0.90
New York University	4,354	0.87
University of Southern California	4,172	0.83
The University of Texas at Dallas	3,206	0.64
Carnegie Mellon University	2,843	0.57
The University of Texas at Arlington	2,473	0.49
Arizona State University	2,389	0.48
University of Illinois	2,284	0.45
Purdue University	2,076	0.41
Education Level		
Master	129,657	63.10
Bachelor	45,331	22.00
Doctorate	22,399	10.90
Associate	5,097	2.50
Other	3,116	1.50
Field of Study		
Computer Science	19,468	9.47
Computer and Information Sciences, General	12,632	6.14
Electrical and Electronics Engineering	12,202	5.93
Business Administration & Management, General	8.657	4.21
Mechanical Engineering	8.203	3.99
Information Technology	5,303	2.58
Information Science/Studies	5,256	2.56
Industrial Engineering	4,564	2.22
Civil Engineering, General	4,560	2.22

Table 4 (continued)

Management Science	4,406	2.14
Country		
India	74,460	36.22
China	57,074	27.76
Republic of Korea (South Korea)	7,065	3.44
Taiwan	4,733	2.30
Nepal	3,628	1.76
Nigeria	3,345	1.63
Canada	3,160	1.54
Vietnam	2,970	1.44
Brazil	2,544	1.24
Saudi Arabia	1,970	0.96
Gender		
Male	117,666	57.23
Female	87,901	42.75
Other	33	0.020

n=205, 660

Note. Data from ICE FOIA request.

Tuition

Tuition data was retrieved from IPEDS, specifically the out-of-state, undergraduate tuition rate for public institutions, or undergraduate tuition for private institutions (IPEDS, 2004-2019). Graduate tuition was used when a HEI did not enroll any undergraduate students. Examples include law schools, medical schools, and other specialized graduate schools. A number of factors affect what students pay, and research indicates that international students typically pay additional fees on top of tuition rates (Krsmanovic & Sabina, 2020). Undergraduate tuition (when available) was best used as a proxy for cost, which allowed for an understanding of how tuition rates may affect ISE.

Economic Indicators

I used U.S. states' unemployment rates from the BLS as one of the economic indicators for this study. The Local Area Unemployment Statistics program provides monthly unemployment data for 393 metro areas and 50 states. Seasonally adjusted unemployment rates were used for this study, which aims to measure and remove typical market fluctuations that occur month to month, like weather, school schedules, and major holidays (BLS, 2001). Using seasonally adjusted data makes it easier to interpret the underlying trends and movements over time of unemployment data (BLS, 2001). Yearly unemployment rates for 2004 to 2019 were calculated by averaging the monthly unemployment data for each state. The unemployment data were freely available on the BLS website (BLS, 2003-2019).

I also used State GDP from the BEA as a second operationalization of the economic condition. State GDP is a comprehensive measure of the state's economy, or the value of the goods and services produced in the state (BEA, n.d.). State GDP can provide an estimate of how economically healthy a state is, which is often determined by companies located in the state and

the profits made there. The State GDP datasets were retrieved through their website for 2004 to 2019, and the yearly averages were used as a predictor (BEA, 2003-2019).

GDP and unemployment yearly rates are normally calculated based on the calendar year (January to December) versus an academic year (approximately August to July) like other variables and datasets including ISE, OPT, USNWR, and IPEDS variables. I adapted the economic variables and calculated the yearly average based on the total from August – July to ensure consistency and accuracy with the other variables' measurements. For example, the 2019 GDP was actually the average of the August 2018 – July 2019 monthly data, so it aligned with 2019 ISE and OPT data.

Grouping Variable

The Carnegie classification (CC) of HEIs was used as a grouping variable to answer the second and fourth research questions. A HEI's research activity, majors offered, and enrollment is incredibly important for international students, indicated by IIE data (2019) which shows that 72% of international students enrolled in doctoral HEIs in 2018/2019. Seventy-five percent of those international students chose a Research 1 HEI, or a HEI with the highest research activity (IIE, 2019). The emphasis on doctoral institutions also aligns with many international students who choose to study STEM fields (Gesing & Glass, 2019; IIE, 2019). Given that the majority of international students choose to attend doctoral HEIs, there was likely a big difference between ISE change over time and the predictors' influence based on the institutional type. Therefore, it made sense to see how different HEIs respond to the predictors within their CC, which includes similar HEIs.

Table 5 shows how different institutions were grouped for analysis according to their designated CC. Each HEI is classified according to a combination of some of these categories:

the academic level and number of degrees it confers, research dollars awarded, focus of the degrees (arts/sciences vs. diverse fields), career/technical/high transfer activity, tribal colleges, faith-based institutions, or special focus. (The Carnegie Classification of Institutions of Higher Education [Carnegie], n.d.). I grouped the IPEDS data by combining CCs for HEIs to fit the goals and purposes of this study. These groups are referred throughout the study as CC1, CC2, CC3, and CC4. The groups included:

- CC1: Doctoral Universities: Very High Research Activity (Also referred to as Research 1 institutions)
- CC2: Doctoral Universities: High Research Activity and other Doctoral/Professional Universities
- CC3: Master's Colleges and Universities, and Baccalaureate Colleges
- CC4: Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges

IPEDS changed the way that institutions were categorized by Carnegie Classification four times through the data analysis period, which was 2003/2004 to 2018/2019. For consistency's sake, I chose to use the Carnegie classification that has been mostly standardized since 2005. In the 2003/2004 IPEDS data, doctoral institutions were not categorized according to the common categories now known as "Research 1" (CC1) and Research 2" (CC2). Therefore, I used 2004/2005 Carnegie Data for the 2003/2004 academic year for all institutions. I used the classification system that was introduced in 2005 for all years and did not use the subsequent minor updates that IPEDS introduced in 2015 and 2018.

Table 5

Carnegie Classification and Research Categories

Carnegie Category	Carnegie Classification	HEIs	%
Doctoral Universities – Research 1 (CC1)			
15	Doctoral Universities: Very High Research Activity	1,646	3.57
Doctoral Universities – Research 2 and Other Doctoral Institutions (CC2)			
16	Doctoral Universities: High Research Activity	1,591	3.45
17	Doctoral/Professional Universities	1,200	2.60
Master's Colleges and Universities, and Baccalaureate Colleges (CC3)			
18	Master's Colleges & Universities: Larger Programs	2,557	12.04
19	Master's Colleges & Universities: Medium Programs	2,534	5.49
20	Master's Colleges & Universities: Small Programs	1,591	3.45
21	Baccalaureate Colleges: Arts & Sciences Focus	4,053	8.78
22	Baccalaureate Colleges: Diverse Fields	4,609	9.99
Baccalaureate/Associate's Colleges, Associate's Colleges. Special Focus Institutions, and Tribal Colleges (CC4)			
23	Baccalaureate/Associate's Colleges: Mixed Baccalaureate/Associate's	722	1.56
24	Special Focus Four-Year: Faith-Related Institutions	3,464	7.51
25	Special Focus Four-Year: Medical Schools & Centers	726	1.57
26	Special Focus Four-Year: Other Health Professions Schools	1,098	2.38
27	Special Focus Four-Year: Engineering Schools	81	0.18
28	Special Focus Four-Year: Other Technology-Related Schools	44	0.10
29	Special Focus Four-Year: Business & Management Schools	155	0.34
30	Special Focus Four-Year: Arts, Music & Design Schools	847	1.84
31	Special Focus Four-Year: Law Schools	320	0.69
32	Special Focus Four-Year: Other Special Focus Institutions	170	0.37
33	Tribal Colleges	250	0.54

Table 5 (continued)

1	Associate's Colleges: High Transfer-High Traditional	1,410	3.06
2	Associate's Colleges: High Transfer-Mixed Traditional/Nontraditional	4,288	9.29
3	Associate's Colleges: High Transfer-High Nontraditional	2,064	4.47
4	Associate's Colleges: Mixed Transfer/Vocational & Technical-High Traditional	1,698	3.68
5	Associate's Colleges: Mixed Transfer/Vocational & Technical-Mixed Traditional/Nontraditional	1,532	3.32
6	Associate's Colleges: Mixed Transfer/Vocational & Technical-High Nontraditional	498	1.08
7	Associate's Colleges: High Vocational & Technical-High Traditional	1,964	4.26
8	Associate's Colleges: High Vocational & Technical-Mixed Traditional/Nontraditional	32	0.07
9	Associate's Colleges: High Vocational & Technical-High Nontraditional	638	1.38
10	Special Focus Two-Year: Health Professions	0	0
11	Special Focus Two-Year: Technical Professions	702	1.52
12	Special Focus Two-Year: Arts & Design	494	1.07
13	Special Focus Two-Year: Other Fields	160	0.35
14	Baccalaureate/Associate's Colleges: Associate's Dominant	6	0.01

Control Variables

Seven control variables were used to account for important factors that may affect ISE data variability. These included Carnegie classification, student population, HEI state (region), campus setting, institutional funding, STEM degrees awarded, and graduate student population. All categorical control variables - HEI state (region), campus setting, institutional funding, and CC – were dummy coded for analysis.

Carnegie Classification

Carnegie classification was used as a control variable to answer RQ1 and RQ3, and as a grouping variable for RQ2 and RQ4. See the section above for more details on CC.

Student Population

Since this study aimed to understand how different factors impact ISE at HEIs, it was important to account for the overall size of the HEI. For example, two institutions could have a 5% international student population: For a large university with 30,000 students, that would equal 1,500 students, but for a smaller university of 5,000, it would only be 250. Therefore, each HEI's student population in the overall dataset was included as a continuous control variable for the analyses. The student population was retrieved through the IPEDS 12-month enrollment dataset (IPEDS, 2004-2019). Controlling for the HEI size provided a clearer understanding of how the factors affected the outcome variable of ISE.

State

The U.S. state of each HEI was originally attended to be used as a fixed effect control variable in this study. The state's potential effect on the economic viability and attractiveness of a HEI was discussed in detail in Chapter 2. Since GDP and unemployment rates are measured at the state level, it was important to include the state as a control variable. This data on the U.S. state was retrieved from the IPEDS institutional characteristics (IPEDS, 2004-2019).

The U.S. state was also included as a control variable because of the consequential influence that a state has on its HEIs. Particularly, state legislation and policies influence public HEIs, regulating anything from student tuition rates, non-state resident populations, budgets, accountability measures, and programs or services offered (Kelchen, 2018). Private HEIs are influenced by state policies to a lesser degree, but these HEIs are still affected by state regulations and budgets (Kelchen, 2018). Additionally, the perception of a particular state could certainly impact whether a student attends a HEI. An international student may be much more likely to attend a state that is known to be more welcoming of immigrants and international

students or that has a strong economy, as opposed to a state that is known to be less friendly to diverse populations.

Although I planned to use U.S. state as a control variable, due to statistical power necessities, I ended up using U.S. region as defined by IPEDS (Knapp et al., 2012). I chose to include the information and reasoning for using state because a state's policies do play a significant role in the way a HEI is run (Kelchen, 2018). Further description of U.S. Region classification is explained in Table 6.

Table 6

United States Region Detailed Information

Region	States	Total HEIs [a]	% of total HEIs
New England	CT, ME, MA, NH, RI, VT	499	17.30%
Mid-East	DE, DC, MD, NJ, NY, PA	395	13.70%
Great Lakes	IL, IN, MI, OH, WI	683	23.68%
Plains	IA, KS, MN, MO, NE, ND, SD	432	14.98%
Southeast	AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, WV	254	8.81%
Southwest	AZ, NM, OK, TX	212	7.35%
Rocky Mountains	CO, ID, MO, UT, WY	304	10.54%
Far West	AK, CA, HI, NV, OR, WA	85	2.95%
Puerto Rico	PR	20	0.69%

Note. n = 2,884

[a] Numbers and percentages are derived from this study's unique dataset

Campus Setting

Recent reports from the United Nations (2018) suggest that most of the world's population lives in urban areas, and by 2030 this number will rise to 60%. Economic opportunities are disproportionally located in cities (Ruiz, 2014), so students who choose a HEI based on economic potential will likely consider whether the location is urban, suburban, or rural. This fixed effect variable was operationalized by employing the degree of urbanization variable that IPEDS uses to categorize HEIs: Urban, suburban, town, and rural. The U.S. Census Bureau developed a methodology in 2005 to determine a location's urban-centric locale, and IPEDS uses its criteria to categorize HEI's classification based on the 2010 census population (Geverdt, 2015). Each city and suburb location have subcategories of large (more than 250,000 people), midsize (100,000 - 250,000 people), or small (less than 100,000 people) based on population. Town and rural categories have subcategories of fringe (more than or equal to 10 miles), distant (10-35 miles), and remote (less than 35 miles) based on its location relative to an urbanized center (Geverdt, 2015). This study employs a categorization of urban, suburban, town, and rural by using IPEDS categorization.

Institutional Funding Type

Institutional funding type was included as a fourth control variable for RQ3 and RQ4. This was determined by whether a HEI is public or private, as designated in the IPEDS data (IPEDS, 2004-2019). As explained by the inclusion of a state (region) as a control variable, the HEI's state was likely to have an impact on their enrollment, funding, and other policies. An institution's funding status greatly impacts how they are administered, and potentially their likelihood to enroll international students. After the 2008 recession, public HEIs in particular had a large uptick in their ISE due to increased recruitment to account for declining state

appropriations (Macrander, 2017a; Shen, 2016). The influence of state policies is even more pronounced for public institutions. This was important to include as a control variable.

Graduate Student Population

Although the number of undergraduate international students surpassed the graduate international student numbers in the 2011/2012 academic year, graduate students have always been an important part of the international student population, particularly for some degrees (IIE, 2001 – 2019). In the 2018/2019 academic year, graduate students comprised 43% of the total ISE. However, graduate international students make up a larger proportion of the overall graduate student population in the United States than undergraduate international students do (IIE, 2019). Although ISE data was not separated according to graduate or undergraduate status, it was important to include graduate students as a control variable to account for the numbers of international students that may naturally flow more toward certain type of HEIs that enroll more graduate students.

STEM Student Population

International students disproportionally choose to major in STEM fields (Gesing & Glass, 2018; IIE, 2019), and OPT even has a STEM extension which may encourage more international students to enroll in the United States (USCIS, n.d.-a). In many graduate STEM programs, over 50% of students may be international (IIE, 2001-2019). Therefore, a HEI that has a large number of STEM programs and graduates is potentially more likely to enroll more international students. It was important to include the number of STEM degrees awarded each year to account for this likelihood.

IPEDS does not categorize or calculate the number of STEM students, so I make those calculations based on IPEDs data and guidance from DHS. One of the major advantages of

pursuing a STEM designated degree in the U.S. is the ability to apply for a two year OPT extension. To calculate STEM totals, I used the STEM Designated Degree Document, which is a complete list of the fields of study that the DHS considers to be STEM degrees that are eligible for the 24-month STEM OPT extension (ICE, 2016). IPEDS uses the Classification of Instructional Program (CIP) code to categorize academic programs, and the CIP code of each international student is designated on their entry visa paperwork (I-20). There are four two-digit CIP code categories that comprise the STEM degree field: Engineering (14), Biological and Biomedical Sciences (26), Mathematics and Statistics (27) and Physical Sciences (40). Additionally, there are 18 other six-digit CIP codes that are subcategories of other majors that are eligible for the STEM OPT extension and are thus classified as STEM students for this study (ICE, 2016). In total, there were 486 CIP six-digit codes that comprised the STEM student category for this study. In order to calculate the total STEM student amount for each HEI in each individual year, I used total STEM completions, or degrees awarded, for each of the 486 CIP codes that were classified as STEM. CIP codes are only provided for completions within IPEDS, not for all enrolled students as other characteristics are like total student enrollment and graduate student enrollment.

Higher Education Institutions

This research study focused on ISE by examining data from individual U.S. HEIs. There were 2,884 HEIs analyzed for RQs 1 and 2, and 2,649 HEIs for RQs 3 and 4. A HEI was included in this study if: (a) it enrolled at least one international student from 2003/2004 to 2018/2019 (or just 2018/2019 for RQ3 & RQ4); (b) it was degree-granting; (c) it was non-profit; and (d) it was located in one of the 50 states, the District of Columbia, or the Commonwealth of Puerto Rico. If an institution closed or merged with another institution during the timeframe, it

was not included in the dataset. The final sample included 2,884 HEIs, for a total of 46,144 observations for 16 years of data, and 31,724 observations for RQ1 and RQ2 (2004-2019). Missing data is particularly problematic with time series regression (Box-Steffensmeier et al., 2014), so I took a number of steps to ensure that the data was 100% complete.

Missing Data

With 16 years and 2,884 institutions, it was important to take the time to ensure that each HEI had an accurate datapoint for every year and variable. This section details how I supplemented or altered the original data that I collected from IPEDS to finalize the dataset.

First, I discovered that a number of professional institutions, primarily medical and law schools, did not report any graduate enrollment for six years (2003/2004-2009/2010). For the 2010/2011 academic year, IPEDS eliminated the "first professional degree" category, which is why professional schools began to report their data differently (NCES, n.d.-b). For those HEIs, I took the average graduate enrollment percentage for the 10 available years and used that percentage and the total student enrollment to compute the graduate student enrollment numbers. I made this imputation for all of the unavailable years for 87 institutions (3.02% of total HEIs). There were also 26 different institutions (0.90% of total HEIs) that were missing tuition and/or overall student enrollment for three years or less, so I averaged the amount in between the years when they did report data and used that as the imputed amount.

After retrieving graduate tuition as an alternative to undergraduate tuition for special focus institutions or graduate only institutions, there were just three schools that did not report tuition during the analysis period but reported all other variables. I spoke with NCES data scientists and was alerted that these HEIs only enroll students on a part-time basis, so they do not provide their tuition rates the same as other institutions. In order to keep everything standardized,

I dropped these three institutions (Rockefeller University, Irell & Manella Graduate School of Biological Sciences at City of Hope, and Excelsior College) from the dataset.

The BEA did not publish GDP rates for Puerto Rico prior to 2012, so I used data from the World Bank to supplement the GDP for 2003 – 2011 (World Bank, n.d.).

Finally, there were a few unique situations with HEIs that enrolled larger numbers of international students. In 2017, Purdue University combined two of their branches, Purdue – Calumet and Purdue – North Central, and renamed them Purdue University Northwest, which was assigned a different IPEDS number. I discovered that these are the same campuses with a new name, so I totaled and/or averaged all relevant categories for 2003 – 2016 so that the data from those campuses could be used in the analysis. Additionally, Arizona State had inconsistences in how they reported their data to IPEDS, so I accounted for that. From 2003/2004 – 2006/2007, and 2012/2013 – 2018/2019, Arizona State listed three of their campuses separately – Tempe, West, and Polytechnic Campuses. However, from 2007/2008 – 2011/2012 (5 years), they listed all three campuses combined as Arizona State-Tempe. Because I could not break down the data accurately for the 5 years that the three campuses were combined, I combined all three campuses for the full data analysis period and used Arizona State-Tempe as the primary HEI.

Data Analysis

This *ex post facto* quantitative study utilized existing data to examine the impact of postgraduate employment, economic conditions, ranking, and tuition on ISE in the U.S. This study included four main research questions.

Research Question 1

RQ1 asked how international student enrollment at U.S. higher education institutions related to ranking, tuition, GDP, and the unemployment rate from 2008 to 2019. The research question was answered using time series regression analysis, with each institution and each analyzed year (2008-2019) comprising a separate case. Based on IPEDS data, there were 2,884 individual institutions and 46,144 observations for 16 years of data.

My particular research questions and data specifications led me to use an autoregressive distributed lag model of time series regression. Specifically, I used an Arellano-Bond (AB) Dynamic Estimator, which is a generalized method of moments (GMM) estimator used to analyze dynamic models of panel data (Arellano & Bond, 1991). AB works well with data that has few time periods and large panel numbers, which described my dataset with 2,884 institutions and 16 years of data. For this study's purposes, I chose four years of lag time for both the predictors and the outcome variable. Each year of HEI ISE data yields a combination of students that began their degree program at different times. The predictors impact students at different points in times, which needed to be accounted for the model. This lagged dependent variable also helped account for any fixed effects that may have influenced international student enrollment (Arellano & Bond, 1991), including stationary data that does not change over the 16-year time period, like state/region, campus setting, and institutional funding type. A lagged endogenous variable also can help offset any serial correlation that may occur, which is typically a violation of regression (Box-Steffensmeier et al., 2014).

As Wooldridge (2000) and Box-Steffensmeier and associates (2014) identified, theories are typically insufficient to guide selection of lag times for social science research. Therefore, I selected a lag time based on my research and experiences with students. A lag model was

appropriate because international students decide where to attend a HEI based on data from several years before they enroll at their HEI. Students typically begin to search and narrow down their HEI choices a few years in advance, based on data from previous years. For example, an international student who enrolled at ODU in Fall 2020 likely consulted the USNWR rankings and other data (alumni postgraduate employment, the economic vitality of the HEI's city and state) in 2019, which would have likely been based on data from 2018.

The model for RQ1 was:

$$y_{sit} = \alpha_0 + \alpha_1 y_{sit-1} + \alpha_2 y_{sit-2} + \alpha_3 y_{sit-3} + \alpha_4 y_{sit-4} + \beta_1 (\mathcal{W}_{sit} + \mathcal{W}_{sit-1} + \mathcal{W}_{sit-2} + \mathcal{W}_{sit-3} + \mathcal{W}_{sit-4}) + \beta_2 (\mathcal{X}_{sit}) + e_t$$

Where y_{sit} was the international student enrollment at each HEI for each of the observed years (2004 - 2019); $\mathcal{W}$ was a vector of the exogenous variables, which included ranking, unemployment, GDP, and tuition; and X was a vector of the control variables, which are not lagged, and included CC, total student enrollment, STEM, and graduate enrollment. β was the standardized coefficient for each predictor, and α was the coefficient for the outcome variable. The subscripts designated the time, number of lags, and nesting of the data. For example, $_{sit-4}$ signifies that a variable is nested in an institution ($_i$) within a state ($_s$), and that this variable is lagged for four years to account for more advanced students who enrolled earlier at the institution. ISE, tuition, and ranking are nested within the state because all HEIs are affected by the policies and contexts of the states where they are located.

I planned to use a Breusch Godfrey Test to determine if there was serial correlation, which is a major assumption of regression and time series (Box-Steffensmeier et al., 2014). However, I ended up using an Arellano-Bond test to examine serial correlation due to the specifications of the time series model. Serial correlation means that variable data affect each

other from time point *a* to time point *b*, meaning that the data is not random and is interconnected (Box-Steffensmeier et al., 2014; Woolridge, 2000). Since there was serial correlation found in the first differenced errors, I was unable to use OLS. However, I was able to continue using the AB estimator since no other serial correlation was found.

I ran a test to check for non-normal distribution prior to proceeding with the analyses. I expected that ISE would not be normally distributed based on available ISE data from IIE. For example, in the 2019/2020 academic year, 33.8% (n = 1,987) of HEIs had less than 10 international students. Since ISE did not have a normal distribution, I logged the outcome variable to simulate normality. More details are found in Chapter 4. I also checked for heteroskedasticity and multicollinearity and made adjustments as needed, which are described in detail in Chapter 4.

I also ran a sensitivity check by using the percentage of international students at each HEI as the outcome variable as opposed to the raw number of international students to see how the results might change. All findings were in line with using the raw numbers, so I continued with my original model. More details about the sensitivity check can be found in Appendix A. This check helped to ensure that the findings were robust, and the conclusions were valid (Ashley & Parmeter, 2020). I was unable to test for effect sizes due to the use of robust errors to account for heteroskedasticity, but I interpreted my results in light of a more stringent p value in order to determine practical significance.

Research Question 2

RQ2 focused on how international student enrollment at U.S. higher education institutions related to ranking, tuition, GDP, and the unemployment rate from 2008 to 2019 differed by Carnegie classification. I ran the same time series regression analyses as RQ1

according to CC. I ran four separate regressions based on the groups: (CC1) Doctoral Universities: Very High Research Activity; (CC2) Doctoral Universities: High Research Activity and other Doctoral/Professional Universities; (CC3) Master's Colleges and Universities, and Baccalaureate Colleges; and (CC4) Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges. All of the same assumption testing and information for RQ1 also applied to RQ2.

The model looked essentially the same for RQ2, except that the overall *n* for each group was different, and CC was removed as a control variable and used as a grouping variable. CC1 (Very High Research Activity Doctoral Institutions) had an overall observation *n* of 1,101, CC2 (High Research Activity Doctoral Universities and other Doctoral/Professional Universities) was 1797, CC3 (Master's Colleges and Universities, and Baccalaureate Colleges) was 12,426, and CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) was 15,919.

GDP, tuition, ranking, and unemployment rates were all entered into the model as continuous predictors. State (region), campus setting, and institutional funding type were not used in RQs 1 or 2 because their values did not change over time, which violated the assumptions of a time series regression.

Research Question 3

RQ3 asked how international student enrollment at U.S. higher education institutions related to ranking, Optional Practical Training, undergraduate tuition, GDP, and unemployment rates in 2019.

The model for RQ3 was:

$$y_{si} = \alpha_0 + \beta_1 (\mathcal{W}_{si}) + \beta_2 (\mathcal{X}_{si}) + e$$

Where y_{si} was the international student enrollment at each HEI; $\mathcal{W}$ was a vector of the exogenous variables, which included OPT, ranking, unemployment, GDP, and tuition; and X was a vector of the control variables, which included CC, total student enrollment, STEM, graduate enrollment, state (region), institutional funding type, and campus setting. All control variables and all predictors were able to be used for this analysis of 2018/2019 ISE.

The third research question included OPT as an additional predictor. Because I was only able to obtain complete OPT data from ICE for 2018/2019, I could only run one year of analysis. Linear OLS regression was used for RQ3, since it only examined one year and adjustments were made for any violation of assumptions (Cohen et al., 2003).

Research Question 4

RQ4 examined how international student enrollment at U.S. higher education institutions related to ranking, Optional Practical Training rates, tuition, GDP, and the unemployment rate and economic conditions in 2019 differ by Carnegie classification. The same data analysis steps and model were used for RQ4 as in RQ3, except that I ran four separate regressions according to the CC groups. Similar to RQ2, CC was used as a grouping variable and not a control variable for RQ4.

Limitations

There are several limitations that are important to note about this study. As with any *ex-post-facto* study, the findings are constrained by the limitations of the datasets themselves. The biggest limitation with using IPEDS data to quantify ISE is that it also includes DACA students, so there may be some data inconsistencies or discrepancies in states or HEIs that enroll large number of DACA students. However, IPEDS was critically analyzed and determined to be the most accurate source of ISE data. Due to the nature of IPEDS data, I was unable to break down

ISE based on nationality. All datasets used in this study are widely utilized, referenced, and deemed as reliable sources of information. Although this study is comprehensive and longitudinal, it does not include analysis from the most recent two academic years. Therefore, some results may not be applicable in the current COVID and immediate future post-COVID environment. The goal of the study was to examine important variables that influence ISE based on the literature, but certainly there are factors that were not included and may be important. Lastly, this study examines 2,884 HEIS in the United States, or virtually all non-profit and accredited institutions who enrolled international students during the analysis time frame. However, the results of this study may not be applicable to other countries and other contexts.

Summary

Chapter Three outlined the methodology used in this *ex post facto* quantitative study, which examined the impact of ranking, GDP, unemployment rate, tuition, and OPT on ISE in the United States. The study was guided by four research questions that examined five predictors' influence on the outcome variable from 2008 to 2019, including how it differed according to institutional Carnegie classification. These questions enabled a better understanding of the crucial factors that influence ISE in the United States. The unique dataset created for this study included institutional ranking from USNWR, unemployment rates from the BLS, GDP numbers from the BEA, OPT data from ICE, tuition data from IPEDS, ISE numbers from IPEDS, and institutional control variables from IPEDS. Time series regression was used for RQs 1 and 2, and Linear OLS regression was used for RQs 3 and 4. Chapters Four and Five discuss the findings, conclusions, and implications of this research study.

CHAPTER IV

RESULTS

This study examined how academic and economic factors related to international student enrollment in the United States over the last 16 years (2003/04 to 2018/19), which included tuition, GDP, unemployment rate, ranking, and Optional Practical Training (OPT). This chapter outlines the results of the data analysis as it pertains to each of the research questions. Data for the first two research questions (RQ1 and RQ2) were analyzed using time series regression, particularly an Arellano-Bond estimator for an autoregressive distributed lag model. Linear OLS regression was used for the remaining research questions (RQ3 and RQ4) to analyze the variables for the 2018/2019 academic year, which included OPT in the analysis. Results were also analyzed using Carnegie classification (CC) as a grouping variable to better understand how the predictors influenced different types of institutions.

A higher education institution (HEI) was included in this study if the following criteria were met: (a) it enrolled at least one international student from 2003/2004 to 2018/2019 (or just 2018/2019 for RQ3 & RQ4); (b) it was degree-granting; (c) it was non-profit; and (d) it was located in one of the 50 states, the District of Columbia, or the Commonwealth of Puerto Rico. If an institution closed or merged with another institution during the timeframe, it was not included in the dataset. The final sample included 2,884 HEIs, for a total of 46,144 observations for 16 years of data, and 31,724 observations for RQ1 and RQ2 (2004-2019). 2,649 institutions were examined for RQ3 and RQ4. In total, 14,156,382 international students enrolled at the HEIs examined in this study over 16 years.

Analysis of Research Questions

This study examined the following research questions:

- RQ1: How does international student enrollment at U.S. higher education institutions relate to ranking, tuition, GDP, and the unemployment rate from 2008 to 2019?
- RQ2: How does international student enrollment at U.S. higher education institutions relate to ranking, tuition, GDP, and the unemployment rate from 2008 to 2019 when differentiated by Carnegie classification?
- RQ3: How does international student enrollment at U.S. higher education institutions relate to ranking, Optional Practical Training rates, tuition, GDP, and the unemployment rate in 2019?
- RQ4: How does international student enrollment at U.S. higher education institutions relate to ranking, Optional Practical Training rates, tuition, GDP, and the unemployment rate in 2019 when differentiated by Carnegie classification?

Descriptive Statistics

Table 7 provides an overview of descriptive data by categorical variable (i.e., campus setting, ranking, institutional funding type, and Carnegie classification), including the mean, standard deviation, minimum, maximum, and total values of international student enrollment (ISE) for each category. Minimum and maximums are reported, however, it is important to note that if only one university did not report for a given year the minimum is zero for that variable. For Tables 7, 8, and 9, the mean is quantified as the average ISE for all HEIs from 2003/4 – 2018/9, and the standard deviation, minimum, maximum, and total are based on all 2,884 HEIs for 16 years. Lastly, total ISE is defined as the cumulative ISE for all HEIs in the respective category from 2003/4 – 2018/9.

A few statistics are noteworthy: about two out of five (42.75%) HEIs were located in a city, which means that the HEI was located inside an urbanized area and a principal city (Geverdt, 2015). More than half of HEIs in this analysis (56.65%) were not ranked in the *USNWR* ranking lists, and the breakdown of private and public institutions was close to equal, with public institutions comprising 52.91% of the sample, and private institutions comprising 47.09%. About half (50.63%) of HEIs were classified as a Baccalaureate/Associate's College, Associate's College, Special Focus Institutions or Tribal College (The Carnegie Classifications of Institutions of Higher Education, n.d.). The highest research-intensive institutions (i.e., Research I Institutions or CC1), comprised only 3.57% of HEIs, but accounted for 36.40% of all ISE in the 16-year timeframe.

Tables 7, 8, and 9 give a glimpse into how ISE differed based on categorical variables, including select states (Table 8), and regions (Table 9). It is clear that ISE differs greatly based on institutional factors. For example, HEIs that are public, urban, and highly ranked with high research activity typically enroll more international students than other categories of HEIs.

Table 7

Descriptive Data and International Student Enrollment Totals

			International Student Enrollment (2003/4-2018/9)				
Variable	*n*	%	Mean	SD	Min	Max	Total
Campus Setting [a]							
City	1,233	42.75	485.05	1115.37	0	15,992	9,568,984
Suburb	600	20.80	271.44	694.10	0	9,864	2,605,821
Town	553	19.17	145.11	451.63	0	15,911	1,283,978
Rural	498	17.27	87.55	380.77	0	8,345	697,600
Institutional Funding Type [a]							
Public	1,526	52.91	391.40	931.00	0	12,140	9,556,310

Table 7 (continued)

Private not-for-profit	1,358	47.09	211.72	738.38	0	15,992	4,600,072
USNWR Ranking [b]							
National Universities & Colleges, 1-50	1,626	3.52	1724.79	2423.93	0	15,992	2,804,509
National Universities & Colleges, 51-100	1,616	3.50	1271.48	1892.16	0	11,517	2,054,708
National Universities & Colleges, Rest of Tier 1	2,753	5.97	833.15	1179.72	0	10,760	2,293,667
National Universities & Colleges, Tier 2	1,664	3.61	534.45	775.64	0	6,086	889,340
Regional Universities & Colleges	12,346	26.76	206.75	456.20	0	15,911	2,552,563
No Ranking	26,139	56.65	136.25	398.13	0	9,339	3,561,596
Carnegie classification [b]							
Doctoral Universities: Very High Research Activities	1,646	3.57	3131.83	2290.05	0	15,992	5,154,992
Doctoral Universities: High Research Activities and Other Doctoral University	2,791	6.05	1011.69	989.58	0	9,012	2,823,635
Master's Colleges/Universities and Baccalaureate Colleges	18,344	39.75	179.07	406.59	0	15,911	3,284,950
Baccalaureate/Associate's Colleges, Associate's Colleges. Special Focus Institutions, and Tribal Colleges	23,363	50.63	123.82	380.51	0	9,339	2,892,804

Note. 2,884 HEIs were used for fixed effect variables (Campus Setting and Funding), while 46,144 observations were used for variables that changed over time (Carnegie, Ranking)

[a] n=2,884. [b] n=46,144

Table 8

Top Five and Bottom Five States by Total International Student Enrollment

			International Student Enrollment (2003/4-2018/9)				
Variable	*n*	%	Mean	SD	Min	Max	Total
Top 5 States							
California	262	9.08	436.74	1015.63	0	12,632	1,830,822
New York	218	7.56	444.39	1144.56	0	15,992	1,550,042
Texas	154	5.34	456.82	1080.97	0	9,339	1,125,598
Massachusetts	101	3.50	461.05	1271.09	0	10,539	745,060
Florida	88	3.05	475.00	957.28	0	5,960	668,801
Bottom 5 States							
Maine	24	0.83	63.96	110.31	0	659	24,560
Vermont	17	0.59	87.82	164.01	0	1043	23,888
Wyoming	8	0.28	127.81	241.66	0	962	16,359
Alaska	5	0.17	199.2	225.79	0	619	15,936
Puerto Rico	20	0.69	17.80	58.82	0	418	5,695

n=2,884

Table 9

International Student Enrollment by U.S. Region

			International Student Enrollment (2003/4-2018/9)				
Variable	*n*	%	Mean	SD	Min	Max	Total
Mid-East	499	17.30	373.58	977.84	0	15,992	2,982,700
Far West	395	13.70	395.13	923.93	0	12,632	2,497,241
Southeast	683	23.68	213.05	588.30	0	9,573	2,328,170
Great Lakes	432	14.98	309.15	959.32	0	12,140	2,136,848
Southwest	254	8.81	400.60	1016.05	0	10,760	1,628,055
New England	212	7.35	319.35	946.56	0	10,539	1,083,222
Plains	304	10.54	217.47	602.09	0	7,200	1,057,796
Rocky Mountains	85	2.95	321.06	826.99	0	15,911	436,655
Puerto Rico	20	0.69	17.797	58.82	0	418	5,695

n=2,884

Table 10 provides an overview of the mean, standard deviation, minimum, and maximum values for all continuous variables throughout the 16 years of data analysis. In total, 14,156,382 international students studied in the United States during from 2003/2004 – 2018/2019. Of particular interest are the ISE numbers and percentages. ISE averaged 306.79 for all 2,884 institutions from 2003/2004 to 2018/2019, of which 12.15% (n = 5,608) did not enroll any international students for a particular year. A total of 16.26% (n = 13,155) of institutions enrolled fewer than ten international students in any given year. The overall mean for ISE percentage was 3.53%, which increased from 3.06% in 2004 to 4.35% in 2019. This ranged greatly according to CC, which is examined further in RQ2 and RQ4. As an example, the ISE percentage for CC1 (Very High Research Activity Doctoral Institutions) institutions was 9.16% or a mean of 2,355 students in 2003/2004, while CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) equaled 2.64% with a mean of 106 students. Subsequent data analysis rigorously analyzed the types of factors most important for ISE in the United States.

Table 10

Summary Data for Continuous Variables

Variable	Mean	Std. Dev.	Min	Max
International Student Enrollment	306.79	850.51	0	15,992
International Student Percentage	3.53	6.34	0	98.55
Tuition ($ USD)	16,038.43	11,142.75	0	71,920.00
State GDP [a]	640,512.70	636,318.30	20,575.00	3,049,375.00
State Unemployment Rate (%)	6.10	2.16	2.30	16.40
Optional Practical Training (OPT) [b]	73.14	291.34	0	4,596
Total Student Enrollment	8,024.85	10,983.27	9	180,464
Graduate Students Enrolled	1,098.89	2,597.07	0	50,372
Graduate Students as a Percentage of Total Enrollment	17.83	27.09	0	100.00

Table 10 (continued)

STEM Students Enrolled	206.86	515.77	0	7,729

n=46,144; [a] Measured in millions of dollars. [b] Only 2018/2019 year

Although fixed-effect control variables were not able to be tested over time due to the time series analytic techniques, there are several interesting observations about one control variable, campus setting, that is worth examining visually. The means for campus setting in Table 7 shows large distinctions between the categories, but the differences are even more interesting when examining the intersection of campus setting and CC. RQ4 analyses show that campus setting is a statistically significant variable for several groups, but Figures 5, 6, 7, and 8 provides a stark visual of the differences in the means of ISE for HEIs based on their CC and location from 2004 to 2019. As the figures show, ISE at CC1 HEIs (Very High Research Activity Doctoral Institutions) grew throughout the time period in a similar pattern no matter their campus setting, although HEIs in towns were much lower. CC2 (High Research Activity Doctoral Universities and other Doctoral/Professional Universities) and CC3 (Master's Colleges and Universities, and Baccalaureate Colleges) do not have as much of a difference between campus setting categories, particularly in recent years. Figure 8 demonstrates that for CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) institutions, the campus location definitely matters. There is a big difference in between HEIs located in cities and suburbs, as compared to towns and rural locations.

Figure 5

Mean International Student Enrollment at Doctoral, Highest Research Activity (CC1) Institutions by Campus Setting

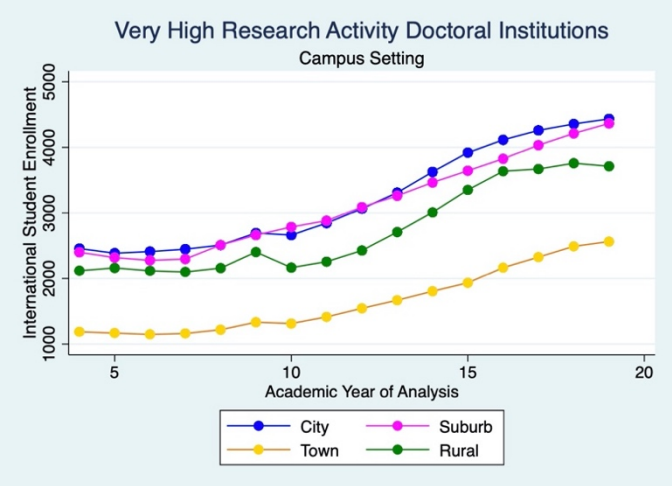


Figure 6

Mean International Student Enrollment at Doctoral, High Research Activity (CC2) Institutions by Campus Setting

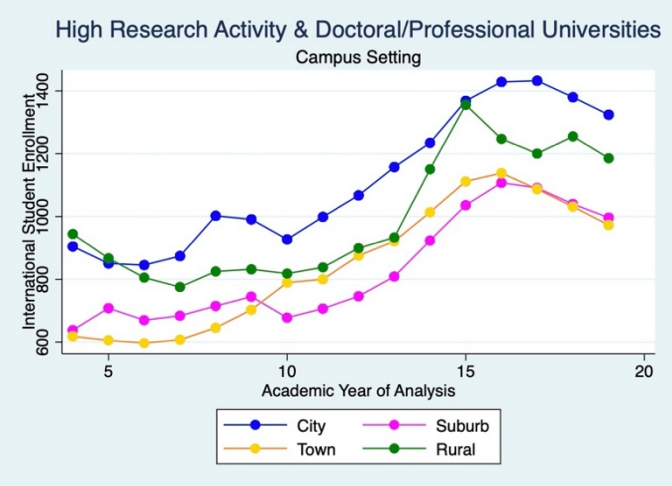


Figure 7

Mean International Student Enrollment at Master and Baccalaureate (CC3) Institutions by Campus Setting

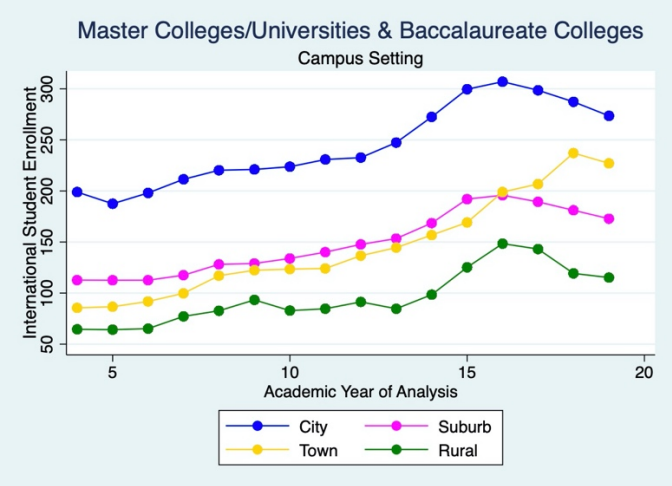
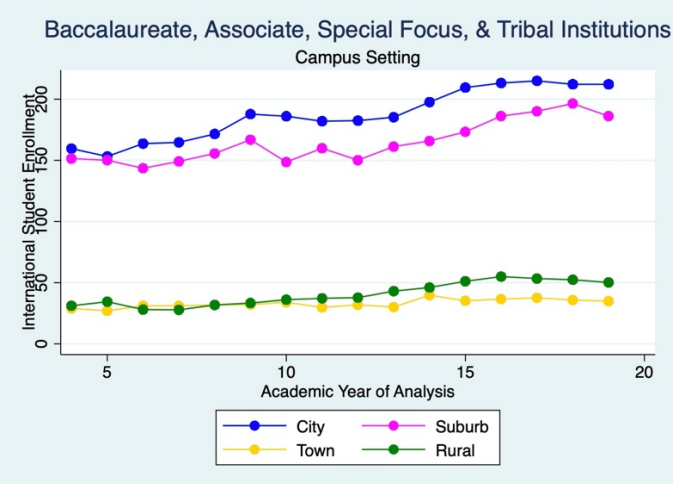


Figure 8

Mean International Student Enrollment at Baccalaureate, Associate, Special Focus, and Tribal (CC4) Institutions by Campus Setting



With 13 variables, 16 years, and close to 3,000 HEIs, there are a lot more insights to uncover. However, location and CC were some of the particularly interesting findings not able to be fully analyzed that were worth briefly discussing.

Data Analysis Process

Time series analytic techniques were used to analyze RQ1 and RQ2. This yielded 12 complete years of analysis when accounting for the four-year lag time that was included for the outcome variable and all main predictors. The Arellano-Bond (AB) Dynamic Estimator was used, which is a generalized method of moments (GMM) estimator used to analyze dynamic models of panel data (Arellano & Bond, 1991). AB works well with data that has few time periods and large panel numbers, which describes my dataset with 2,884 institutions and 16 years of data. A lagged endogenous variable, ISE, was included in the model to account for the importance of a previous year's ISE is in a HEI's current ISE total. International students typically attend a HEI for four years or more, so the ISE of a HEI in one year is highly related to its ISE from the previous year. This lagged dependent variable also helped account for any fixed effects that may influence international student enrollment (Arellano & Bond, 1991), including stationary data that does not change over the 16-year time period, like state (region), campus setting, and institutional funding type. A lagged endogenous variable also helped offset serial correlation, which is typically a violation of regression (Box-Steffensmeier et al., 2014). A simultaneous linear OLS regression (Cohen et al., 2003) was used to answer RQ3 and RQ4. Assumptions checking and modifications made to the data to use regression are described in the subsequent sections. STATA 16.1 IC was used for all analyses.

Assumptions Checking and Amendments Made to Data

The data were checked for normality, heteroskedasticity, and multicollinearity to make sure the assumptions for regression were met. A main assumption of OLS Regression and time series is normal distribution of the outcome variable (Box-Steffensmeier et al., 2014; Cohen et al., 2003). Many variables used in higher education analyses are not normally distributed, and logged count variables are commonly seen in regression analyses (McClure & Titus, 2018; Titus, 2009). The distribution of ISE in this study was not normally distributed. This was expected because many HEIs enroll smaller numbers of international students, and a small number of HEIs account for the vast majority of ISE, as explained in Chapter 3. Therefore, I logged the ISE variable to simulate a normal distribution. Figure 9 shows the distribution of ISE before logging, and Figure 10 shows the distribution after the log transformation. It is important to note that all descriptive statistics and interpretations use the raw, actual number of international students as opposed to the logged variable.

Figure 9

Distribution of International Student Enrollment

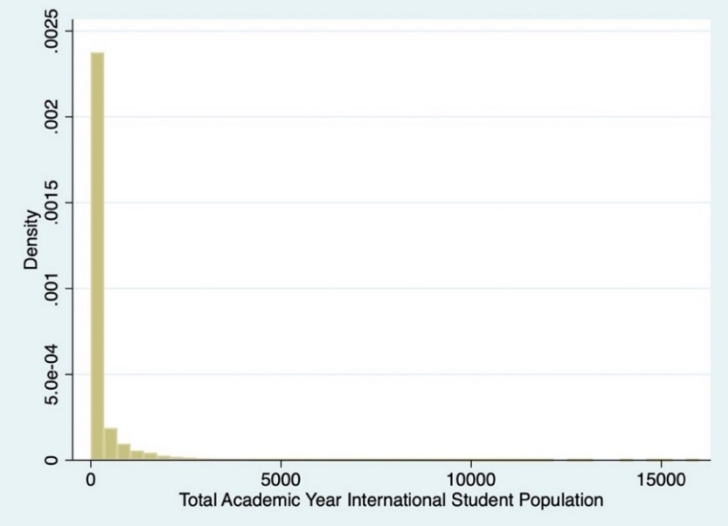
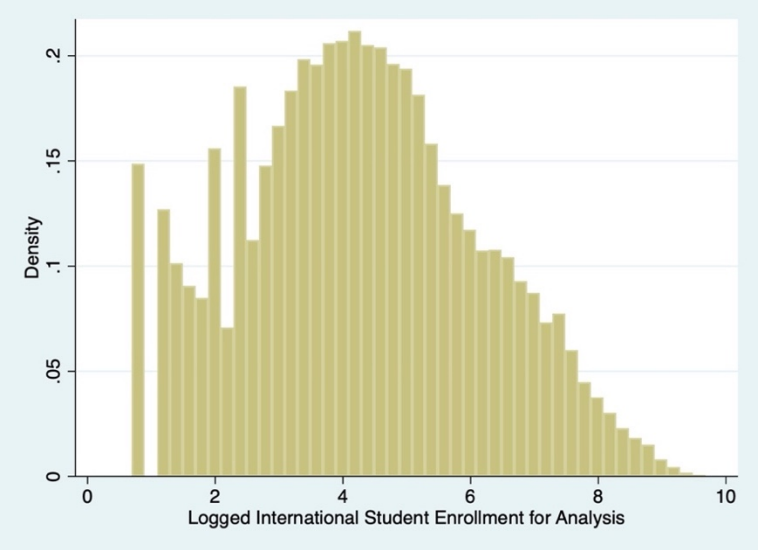


Figure 10

Distribution of Logged International Student Enrollment



Note. HEIs with no ISE in a particular year are included as negative numbers after a log transformation and are not shown in this graph

Next, the data were checked for heteroskedasticity to make sure the assumptions for regression were met. Another important assumption for both time series and OLS is that data is homoscedastic, which means that the residuals of the error term are constant (Cohen et al., 2003). In other words, the variance of the data is similar for all values. The data were found to be heteroskedastic for datasets using the Breusch-Pagan Test. Data were heteroskedastic due to several outlier HEIs that enroll significantly more international students than other institutions. I did not want to eliminate outliers, because those institutions are important for understanding ISE in the United States. I used robust errors in the model for all research questions to account for heteroskedasticity (Cohen et al., 2003). Although I was unable to test heteroskedasticity in

STATA for my dataset in RQ1 and RQ2 due to the AB estimator, heteroskedasticity was found when I checked using OLS regression. I used robust errors throughout due to the nature of the dataset, which used largely the same HEIs.

Finally, the data were checked for multicollinearity. For RQ1 and RQ2, the AB estimator with robust errors did not allow me to use the variance inflation factor (VIF) or tolerance statistics. I used a correlation matrix to check for multicollinearity. There were no correlations over 0.7 for RQ1 and RQ2, which suggested that multicollinearity was not a problem. For RQ3 and RQ4, multicollinearity was checked by examining the VIF and tolerance (1/VIF) statistics. If a predictor's VIF is greater than 10 and tolerance is below .10, then multicollinearity likely exists (Cohen et al., 2003). The examination of VIF and tolerance statistics for predictors demonstrated that all tolerance levels were above .10, and the highest VIF between all five analyses (RQ3 and RQ4) equaled 7.74, with an average VIF ranging from 1.99 to 3.59, indicating that multicollinearity was not a concern.

I also double-checked for multicollinearity in RQ3 and RQ4 using a correlation matrix. In the correlation matrices, all correlations were .6 or lower, with the exception of a few pairs. In RQ4 with CC1 (Very High Research Activity Doctoral Institutions), the predictor tuition and control variable institutional funding type were correlated at 0.84, which is above the recommended correlation strength of 0.70 (Cohen et al., 2003). However, when institutional funding was removed from the model, there were no major changes in the analyses. Secondly, in RQ3, two control variables, graduate student population and STEM population, were correlated at .72. When STEM was removed, all results stayed within a few hundredths of a decimal points, and no variables gained or lost statistical significance. I decided to keep STEM and institutional funding variables in the overall model, because they were only correlated in some but not in all

of the analyses. Interpretations of the significance for these particular variables are made very carefully, considering their higher correlation with another variable.

The Role of Ranking, Tuition, and Economic Conditions on ISE from 2008-2019

The first research question examined how international student enrollment at U.S. higher education institutions related to ranking, tuition, and economic indicators from 2008 to 2019. Four hypotheses were tested:

H_a1: *USNWR* ranking and ISE will have a positive relationship.

H_0 2: Tuition rates will not have a statistically significant effect on ISE.

H_a 3: GDP and ISE will have a positive relationship.

H_a 4: ISE and unemployment rate will have a negative relationship.

I did not specify any differences based on the lagged lengths of the predictor variables.

RQ1 was answered using an AB estimator for a distributed lag model, with a lag of four years. 2,884 institutions yielded 31,724 observations for 12 total years. An AB estimator examines the dynamic differences between years, as opposed to the static values (Arellano & Bond, 1991). This is why there are only 31,724 observations, although it is measuring 12 complete years with four years lag. The four main predictors of ranking, tuition, GDP, and unemployment rate were included in the model with zero, one, two, three, and four lags. Logged ISE was lagged four years and entered into the model along with control variables. Although institutional funding type, campus setting, and state were originally designated as control variables, they were dropped from the model because an AB estimator accounts for the fixed institutional effects when it lags the outcome variable (Arellano & Bond, 1991). Time series only analyzes variables that change over time, which is not the case for fixed effects like state, campus setting, and institutional funding type. CC was still included as a control variable

because the CC of HEIs did shift over time for many HEIs in the analysis. The final RQ1 model was:

$$y_{sit} = \alpha_0 + \alpha_1 y_{sit-1} + \alpha_2 y_{sit-2} + \alpha_3 y_{sit-3} + \alpha_4 y_{sit-4} + \beta_1 (\mathcal{W}_{sit} + \mathcal{W}_{sit-1} + \mathcal{W}_{sit-2} + \mathcal{W}_{sit-3} + \mathcal{W}_{sit-4}) + \beta_2 (\mathcal{X}_{sit}) + e_t$$

Chapter 3 explains the model and variables in greater detail.

The Arellano-Bond tests suggested that first-order serial correlation in the first-differenced residuals was statistically significant ($Z = -23.3$, $p < 0.001$). However, the second, third, and fourth order serial correlation were not statistically significant, which "is consistent with the assumption that the disturbances in the dynamic fixed-effects panel model are serially uncorrelated" (Titus, 2009, p. 454). These values at the subsequent orders were: second ($Z = -0.27$, $p = 0.828$), third ($Z = -0.34$ $p = .730$), and fourth ($Z = -0.20$, $p = .840$).

Results

Table 11 shows a summary of the results. As expected with a dynamic lagged model, lags of the outcome variable ISE were very important in accounting for the current year's ISE. All four lags of ISE were significant, with the importance declining with each subsequent lag: lag one ($b = 0.49$, $p < .001$), lag two ($b = 0.11$, $p < .001$), lag three ($b = 0.05$, $p < .001$), and lag four ($b = 0.02$, $p = .045$). At the first ISE lag, a one percent increase in ISE led to a .49% increase in ISE the following year.

For the state unemployment rate variable, the zero ($b = -0.06$, $p = .020$), first ($b = 0.07$, $p = .034$), and fourth lags ($b = 0.03$, $p = .044$) were significant. Interestingly, the impact of unemployment rate switched from negative to positive in different lag lengths. At zero lags, the beta of -.06 meant that when the unemployment rate rose one percent, ISE declined 6%. However, at lags one and four, an increased state unemployment rate corresponded with

increased ISE. This difference is quite interesting and indicates that economic factors may have an uneven effect on ISE.

State GDP became more significant as the lags progressed, with lags three (b =0.000002, p =.004) and four (b =-0.000001, p =.011) statistically significant. The unstandardized beta values are extremely small because the unit of analysis is one single dollar, with state GDPs ranging from 20.58 billion dollars (Vermont in 2004/2005) to 305.94 billion (CA in 2018/2019). To explain the influence of GDP on ISE more clearly, a $10,000 increase in GDP corresponded with a 2% increase in ISE at lag three.

The only significant lag for ranking was at the first lag, and a higher ranking actually had a negative correlation with ISE. For every category an institution moved in the ranking, it lost 7% of its ISE (b=-0.07, p =.014). For the purposes of analyses and interpretation, the ranking category was analyzed like a continuous variable. Category 1 meant that the institution was not ranked, and 6 corresponded to the highest ranking, which comprised the top 50 higher education institutions on the national colleges and universities USNWR list.

There were no significant findings for tuition at any of the lags.

Several of the control variables were significant in the model. Total student enrollment was significant (b=0.00002, p =.004), as was STEM enrollment (b =-0.0006, p <.001). Non-significant control variables included graduate student enrollment and Carnegie classification.

Table 11

Research Question 1 Results

Predictors	*b*	Robust SE	*z*	*p*
International Student Enrollment				
L1.	0.49	0.02	26.23	0.000***
L2.	0.11	0.01	9.75	0.000***
L3.	0.05	0.01	4.21	0.000***
L4.	0.02	0.01	2.00	0.045*
State Unemployment Rate				
-.	-0.06	0.02	-2.33	0.020*
L1.	0.07	0.03	2.13	0.034*
L2.	-0.03	0.03	-0.91	0.362
L3.	-0.01	0.03	-0.45	0.655
L4.	0.03	0.02	2.01	0.044*
State Gross Domestic Product				
-.	0.0000009	0.0000008	1.28	0.202
L1.	-0.0000004	0.000001	-0.44	0.656
L2.	-0.0000007	0.0000009	-0.79	0.432
L3.	0.000002	0.0000006	2.86	0.004**
L4.	-0.000001	0.0000005	-2.54	0.011*
Tuition				
-.	0.00001	0.00001	1.20	0.229
L1.	0.00001	0.00001	1.25	0.210
L2.	-0.00002	0.00001	-1.33	0.184
L3.	0.0000006	0.000008	0.07	0.948
L4.	-0.00002	0.000009	-1.79	0.074
Ranking				
-.	-0.03	0.03	-0.79	0.430
L1.	-0.07	0.03	-2.46	0.014*
L2.	0.04	0.03	1.43	0.152
L3.	-0.005	0.03	-0.15	0.878
L4.	-0.03	0.03	-1.02	0.308

Table 11 (continued)

Total Student Population	0.00002	0.000007	2.91	0.004**
Graduate Students	0.00005	0.00003	1.31	0.192
STEM Students	-0.0006	0.0001	-4.26	0.000***
Carnegie Category 4	-0.67	0.76	-0.88	0.377
Carnegie Category 3	0.04	0.51	0.07	0.942
Carnegie Category 2	0.20	0.12	1.58	0.115

n = 31,724

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

Sensitivity Check

A sensitivity analysis was undertaken to ensure that using the raw data for ISE was equivalent to using ISE percentage as an outcome variable. This was important to ensure that the findings were robust for HEIs that vary in their overall student population (Ashley & Parmeter, 2020). The ISE percentage was also logged to ensure normal distribution before running the AB estimator. Although there were slight differences in the *z* scores and *p* values between the significant variables and lags, only two differences are worth noting (see Appendix A).

First, GDP at lag four is significant (b =-0.000001, p=.011) when using ISE raw numbers, but not significant (b =-0.0000007, p=.075) when using the ISE percentage. Second, although the total student enrollment control variable was significant for both ISE percentage and raw numbers, they predicted opposite directions in each analysis respectively. 1,000 more students corresponded to a 1% decline when using ISE percentage as the outcome variable (b =-0.00001, p=.019). When using raw ISE numbers (b =0.00002, p=.001), 1,000 more students related to a 2% ISE increase. Although these findings for one control variable are opposite, the rest of the analysis is practically equivalent for interpretation. Therefore, I continued with all analyses using raw ISE numbers because it provided optimal flexibility and detail.

Summary

RQ1 examined the role that ranking, tuition, GDP, and unemployment played on ISE from 2008-2019, including four-year lags for all predictors and the outcome variable. The lagged outcome variable of ISE was highly significant at all four lags in predicting ISE in each analyzed year. A lower unemployment rate at zero lags predicted a higher ISE but lags two and four correlated with ISE in opposite ways, where a higher unemployment rate corresponded to higher ISE. GDP was significantly connected to ISE at lags three and four, but also in opposite directions. In lag 3, a higher GDP correlated to higher ISE, but in lag four a lower GDP corresponded to a higher GDP. Tuition was not significant in any of the lags, and ranking was significant only at the first lag. The control variables of total student enrollment and STEM students were also significant in the model. The results of the ISE sensitivity check using the percentage as opposed to the raw number were described in further detail in this section.

Returning to the hypotheses, some hypotheses were supported, but others were not.

H_a1: *USNWR* ranking and ISE will have a positive relationship.

This hypothesis is rejected, because the significant finding at lag one demonstrated that a ranking and ISE have a negative relationship.

H_0 2: Tuition rates will not have a statistically significant effect on ISE.

The null hypothesis is confirmed, because tuition did not significantly affect ISE at any of the lags.

H_a 3: GDP and ISE will have a positive relationship.

This hypothesis is partially confirmed, because there was a positive relationship at lag three, but negative at lag four.

H_a 4: ISE and unemployment rates will have a negative relationship.

This hypothesis is partially confirmed, because there was a negative relationship at lag zero, but positive at lags one and four.

The Role of Ranking, Tuition, and Economic Conditions on ISE from 2008-2019 Differentiated by Carnegie Classification

The second research question examined how international student enrollment at U.S. higher education institutions related to ranking, tuition, and economic conditions from 2008 to 2019 differentiated by Carnegie classification. Four hypotheses were posed:

- H_a 6: Ranking will be a significant predictor for CC1.
- H_a 7: Tuition will be a significant predictor for CC1.
- H_a 8: GDP will be a significant predictor for CC3 and CC4.
- H_a 9: Unemployment rate will be a significant predictor for CC3 and CC4.

RQ2 utilized CC as a grouping variable to determine if there were any significant differences in the predictors' impact on ISE based on its classification. Previous data has indicated that international students enroll in doctoral institutions at disproportionate rates (IIE, 2019). CC was not used as a control variable for this research question because it was used as a grouping variable.

Simple descriptive statistics confirm other data sources and analysis that indicate that more international students enroll in doctoral institutions. The mean for ISE for CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges. Special Focus Institutions, and Tribal Colleges) was 123.82, while the mean ISE for CC1 (Very High Research Activity Doctoral Institutions) was 3,131.83. It is likely that international students enroll in different types of institutions for different reasons, which should be answered by RQ2. Tables 12, 13, 14, and 15 report the results from the four analyses differentiated by CC.

Table 12

RQ2 Analysis of Very High Research Activity Doctoral Institutions – Carnegie Classification 1

Predictors	*b*	Robust SE	*z*	*p*
International Student Enrollment				
L1.	0.18	0.02	11.64	0.000***
L2.	-0.06	0.007	-8.91	0.000***
L3.	-0.007	0.01	-0.62	0.537
L4.	0.02	0.004	4.70	0.000***
State Unemployment Rate				
-.	-0.005	0.004	-1.07	0.285
L1.	0.01	0.006	1.74	0.083
L2.	0.003	0.006	0.56	0.576
L3.	-0.0002	0.005	-0.03	0.973
L4.	0.02	0.003	5.04	0.000***
State Gross Domestic Product				
-.	0.00000004	0.0000002	0.17	0.862
L1.	0.0000004	0.0000003	1.53	0.126
L2.	0.00000004	0.0000003	0.16	0.875
L3.	0.0000002	0.0000001	1.82	0.068
L4.	-0.0000004	0.0000002	-2.93	0.003**
Tuition				
-.	0.000002	0.000004	0.60	0.546
L1	0.000007	0.000003	2.46	0.014*
L2.	-0.0000008	0.000002	-0.31	0.755
L3.	0.0000004	0.000002	0.18	0.857
L4.	0.000006	0.000003	2.00	0.046*
Ranking				
-.	0.03	0.02	1.92	0.055
L1.	0.02	0.02	1.47	0.141
L2.	0.03	0.01	2.86	0.004**
L3.	0.01	0.009	1.40	0.162
L4.	0.02	0.006	2.85	0.004**

Table 12 (continued)

Total Student Population	0.00003	0.000009	3.49	0.000***
Graduate Students	-0.000005	0.00001	-0.51	0.607
STEM Students	0.00005	0.00002	2.33	0.020

n = 1,101

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

Table 13

RQ2 Analysis of Doctoral Universities: High Research Activity and Other Doctoral Universities – Carnegie Classification 2

Predictors	*b*	Robust SE	*z*	*p*
International Student Enrollment				
L1.	0.82	0.04	20.44	0.000***
L2.	-0.05	0.03	-1.60	0.109
L3.	-0.07	0.05	-1.39	0.165
L4.	-0.07	0.05	-1.26	0.206
State Unemployment Rate				
-.	0.02	0.03	0.52	0.602
L1.	-0.06	0.06	-1.09	0.277
L2.	0.09	0.06	1.34	0.181
L3.	-0.08	0.04	-2.00	0.045*
L4.	0.06	0.02	3.05	0.002**
State Gross Domestic Product				
-.	0.0000008	0.0000009	0.88	0.381
L1.	-0.000001	0.000001	-1.13	0.257
L2.	0.0000006	0.000001	0.46	0.649
L3.	-0.0000008	0.0000008	-1.01	0.312
L4.	0.0000007	0.0000008	0.87	0.383
Tuition				
-.	-0.000001	0.00001	-0.09	0.925
L1.	-0.000005	0.00001	-0.38	0.704
L2.	-0.000007	0.000006	-1.21	0.226
L3.	0.00002	0.00002	1.27	0.204
L4.	-0.00002	0.00002	-1.26	0.207
Ranking				
-.	0.01	0.03	0.35	0.724
L1.	0.01	0.03	0.34	0.730
L2.	0.008	0.03	0.28	0.780

Table 13 (continued)

L3.	0.02	0.03	0.57	0.568
L4.	-0.008	0.02	-0.36	0.720
Total Student Population	0.00002	0.00002	1.13	0.259
Graduate Students	0.00004	0.00004	0.91	0.363
STEM Students	0.0001	0.0002	0.70	0.485

n = 1,797

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

Table 14

RQ2 Analysis of Master Colleges/Universities and Baccalaureate Colleges – Carnegie Classification 3

Predictors	*b*	Robust SE	*z*	*p*
International Student Enrollment				
L1.	0.44	0.03	12.61	0.000***
L2.	0.11	0.02	5.17	0.000***
L3.	0.04	0.02	2.19	0.028*
L4.	0.004	0.02	0.28	0.780
State Unemployment Rate				
-.	-0.04	0.03	-1.03	0.304
L1.	0.06	0.05	1.31	0.191
L2.	-0.04	0.04	-0.84	0.400
L3.	-0.01	0.04	-0.34	0.734
L4.	0.04	0.02	1.88	0.060
State Gross Domestic Product				
-.	0.000001	0.0000009	1.13	0.257
L1.	0.0000001	0.000001	0.09	0.930
L2.	-0.000001	0.000001	-0.88	0.378
L3.	0.0000007	0.0000008	0.83	0.407

Table 14 (continued)

L4.	-0.0000003	0.0000006	-0.50	0.620
Tuition				
-.	0.000007	0.00002	0.35	0.723
L1.	0.00002	0.00002	1.05	0.295
L2.	-0.000007	0.00001	-0.50	0.614
L3.	0.00002	0.00001	1.67	0.096
L4.	-0.00004	0.00001	-2.60	0.009**
Ranking				
-.	-0.03	0.05	-0.53	0.599
L1.	-0.11	0.04	-2.47	0.013*
L2.	0.06	0.04	1.37	0.170
L3.	-0.02	0.04	-0.39	0.698
L4.	-0.05	0.05	-1.00	0.317
Total Student Population	0.00001	0.00001	0.13	0.899
Graduate Students	0.00006	0.00007	0.91	0.365
STEM Students	-0.0003	0.0003	-2.28	0.023*

n = 12,426

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

Table 15

RQ2 Analysis of Baccalaureate/Associate Colleges, Associate Colleges, Special Focus Institutions, and Tribal Colleges – Carnegie Classification 4

Predictors	*b*	Robust SE	*z*	*p*
International Student Enrollment				
L1.	0.52	0.02	28.45	0.000***
L2.	0.12	0.01	8.69	0.000***
L3.	0.05	0.01	3.99	0.000***
L4.	0.03	0.01	2.66	0.008**
State Unemployment Rate				
-.	-0.10	0.04	-2.51	0.012*
L1.	0.11	0.05	2.00	0.045*
L2.	-0.05	0.05	-1.00	0.319
L3.	0.01	0.04	0.25	0.803
L4.	0.02	0.03	0.67	0.502
State Gross Domestic Product				
-.	0.0000006	0.000001	0.56	0.577
L1.	-0.0000009	0.000002	-0.57	0.568
L2.	-0.0000003	0.000001	-0.20	0.844
L3.	0.000003	0.000001	2.91	0.004**
L4.	-0.000002	0.0000008	-2.72	0.007**
Tuition				
-.	0.00002	0.00002	1.30	0.195
L1.	0.00001	0.00002	0.84	0.402
L2.	-0.00003	0.00002	-1.54	0.124
L3.	-0.00001	0.00001	-0.85	0.398
L4.	-0.000006	0.00001	-0.43	0.665
Ranking				
-.	-0.2	0.14	-1.46	0.146
L1.	-0.06	0.17	-0.33	0.744
L2.	-0.19	0.24	-0.78	0.435

Table 15 (continued)

L3.	-0.32	0.28	-1.14	0.253
L4.	-0.13	0.26	-0.50	0.615
Total Student Population	0.00003	0.000009	2.85	0.004**
Graduate Students	0.0002	0.0003	0.63	0.526
STEM Students	-0.001	0.0003	-3.00	0.003**

n= 15,919

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

Results

Lagged ISE

All four categories of CC showed statistically significant findings at one or more lags of the outcome variable. CC2 (High Research Activity Doctoral Universities and other Doctoral/Professional Universities) was only significant at lag one (b =0.82, p <.001), but at a high level.

Based on analysis, CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) institutions' ISE seemed to be the most connected to previous years of ISE, with all four lags highly statistically significant: lag one (b =0.52, p <.001), lag two (b =0.12, p <.001), lag three (b =0.05, p <.001), and lag four (b =0.03, p =.008).

CC1 (Very High Research Activity Doctoral Institutions) ISE rates were significant at lags one (b =0.18, p <.001), two (b =-0.06, p <.001), and four (b=0.02, p <.001). Interestingly, at lag two, higher ISE rates actually predicted lower ISE values. Put another way, one unit, or one student increase at lag two, corresponded to a .06% decline in ISE in the current year.

The first three lags for CC3 (Master's Colleges and Universities, and Baccalaureate Colleges) were significant: lag one (b =0.44, p <.001), two (b =0.11, p <.001), and three (b =0.04, p =.028). Based on the z values, lag one for CC4 was the most influential at Z = 28.45, but based on the beta value, the first lag of CC2 (High Research Activity Doctoral Universities and other Doctoral/Professional Universities) was the most influential (b =0.82).

Unemployment Rate

The unemployment rate as differentiated by state had a moderate impact for the different groupings, depending on Carnegie classification. For CC1 (Very High Research Activity Doctoral Institutions), the unemployment rate was significant at the fourth lag (b =0.02, p <.001). Unemployment rate was significant at two lags for CC2 (High Research Activity Doctoral Universities and other Doctoral/Professional Universities): lag three (b =-0.08, p =.045) and lag four (b =0.06, p =.002). For CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges), it was significant at the zero (b =-0.10, p =.012) and the first lag (b =0.11, p =.045), but in different directions.

GDP

State GDP was the other economic factor that was entered into the model. GDP played more of a role in later lags, and only for some groups. For CC1 (Very High Research Activity Doctoral Institutions), lag four was significant, (b =-0.0000004, p =.003), and for CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges), lags three (b =0.000003, p =.004), and four (b =-0.000002, p =.007), were significant. Interestingly, two of the betas were negative, which meant that as GDP went up, ISE went down.

Tuition

Tuition played a smaller role in explaining ISE in the model, but it did play a role for RQ2 as opposed to RQ1. Lags one (b =0.000007, p =.014) and lags four (b =0.000006, p =.046), for CC1 (Very High Research Activity Doctoral Institutions), and CC3 (Master's Colleges and Universities, and Baccalaureate Colleges) for lag four (b =-0.00004, p =.009) were significant. Put in plain terms, for CC1 (Very High Research Activity Doctoral Institutions) a $10,000 increase in tuition corresponded to a 6 % increase in ISE when referring to lag four. However, tuition played the opposite role for CC3 (Master's Colleges and Universities, and Baccalaureate Colleges) institutions, with a $1,000 increase in tuition correlating to 4% decline in ISE.

Ranking

Ranking was most important for doctoral institutions with very high research activity, otherwise categorized as CC1 for this study. Lags two (b =0.03, p =.004) and four (b =0.02, p =.004) corresponded with a significant increase in ISE. A one unit increase in ranking, or moving up a ranking category, corresponded with a 2% ISE increase for lag four, and a 3% increase from lag three. For CC3 (Master's Colleges and Universities, and Baccalaureate Colleges), ranking was significant at the first lag (b =-0.11, p =.013), which mean that a one-unit increase correlated with a 11% decline in ISE.

Control Variables

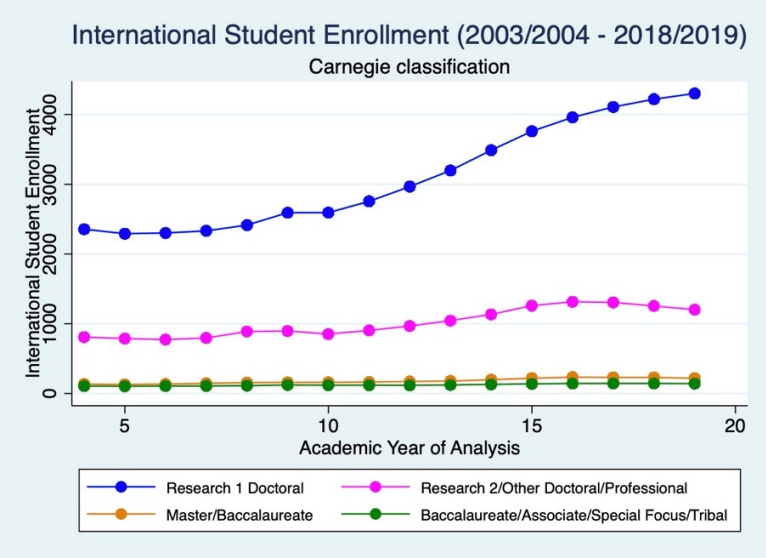
The overall student enrollment was a significant predictor for CC1 (Very High Research Activity Doctoral Institutions) (b =0.00003, p <.001) and CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) (b =0.00003, p =.004). In other words, 1,000 more students correlated to a 3% increase in ISE at CC1 and CC4 HEIs. The overall STEM student population behaved different ways for different institution

categories. For CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) (b =-0.001 p =.003) and CC3 (Master's Colleges and Universities, and Baccalaureate Colleges) (b =-0.0003, p =.023), higher STEM populations corresponded to a decrease in ISE. A larger STEM population at CC1 HEIs related to an increase in ISE (b =0.00005, p =.020). The control variable for graduate student population was not significant for any of the Carnegie categories.

Overall, Figure 11 demonstrates how ISE changed over time as it related to the different CCs. Although this doesn't demonstrate the influence of the predictors that were analyzed in RQ2, this provides a clear image of how ISE has changed over time for different types of institutions.

Figure 11

Mean International Student Enrollment Differentiated by Carnegie classification (2003/2004-2018/2019)



Summary

RQ2 examined how the influence of the predictors - tuition, GDP, unemployment rate, and ranking - differed based on Carnegie classification. Lagged ISE was important for all CCs for at least one lag, with CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) the most influenced by former levels of ISE. Unemployment rate was significant at later lags for CC1 (Very High Research Activity Doctoral Institutions) and CC2 (High Research Activity Doctoral Universities and other Doctoral/Professional Universities), but in differing directions. CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) had stronger correlations for earlier lags of unemployment rate. GDP was important for CC1 (Very High Research Activity Doctoral Institutions) and CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges), but only at later lags. Tuition did play a role at lag four, with higher tuition corresponding to higher ISE for CC1, but lower ISE for CC3 (Master's Colleges and Universities, and Baccalaureate Colleges). The final predictor, ranking, was significant for CC1 and CC3 at several lags, but it influenced ISE in different ways. A higher ranking correlated with higher ISE for CC1 (Very High Research Activity Doctoral Institutions) HEIs, but with lower ISE for CC3 (Master's Colleges and Universities, and Baccalaureate Colleges). Higher overall student enrollment corresponded with higher ISE for CC1 and CC4, and more STEM students correlated to higher ISE for CC1 (Very High Research Activity Doctoral Institutions), and lower ISE for CC3 (Master's Colleges and Universities, and Baccalaureate Colleges) and CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges).

H_a6 - H_a9 focused on how the predictors would behave for some of the CCs. H_a6, which stated that ranking would be significant for CC1, was affirmed at lags two and four, and CC1 was the only group where ranking was significant. H_a7, which posited that tuition would be significant for CC1, was also accurate. Similar to ranking, tuition was significant at two lags for CC1, and was the only significant positive correlation for tuition. To answer H_a8, GDP was significantly connected to CC4, but not CC3. There was a positive and negative correlation with GDP and ISE for CC4, depending on the lag. Therefore, H_a8 is partially confirmed since CC3 was not significant for GDP. Lastly, H_a9, which posited that the unemployment rate and ISE would be significant for CC3 and CC4, was also partially confirmed. Similar to GDP, there was both a positive and negative significant relationship at different lags for CC4, but not for CC3. RQ2 provides evidence of the importance of examining institutions by different criteria and comparing similar institutions.

The Role of Ranking, OPT, Tuition, and Economic Conditions in ISE in 2019

The third research question examined whether international student enrollment at U.S. higher education institutions related to HEI ranking, Optional Practical Training rates, tuition, and economic conditions in 2019. The same hypotheses were offered for RQ3 as RQ1, with the addition of a prediction about how OPT might relate to ISE. Five hypotheses were tested:

H_a1: *USNWR* ranking and ISE will have a positive relationship.

$H_0 2$: Tuition rates will not have a statistically significant effect on ISE.

$H_a 3$: GDP and ISE will have a positive relationship.

$H_a 4$: ISE and unemployment rates will have a negative relationship.

H_a5: OPT and ISE will have a strong positive relationship.

Data Analysis

Research question three included the same four predictors as RQ1 and RQ2, but added the other main predictor - OPT. Additionally, analysis was conducted for only the 2018/2019 academic year. Additional fixed-effect control variables were added to the model, which included institutional funding type, region, and campus setting. I used region as opposed to state in the final model to account for geography without having to sacrifice statistical power, i.e., 9 regions versus 52 states/districts/commonwealths. Reference dummy variables were selected based on the closest category to the overall mean ISE for each variable. This equated to Town (Campus Setting), Public (Institutional Funding), Carnegie class 2 (Carnegie class), and Great Lakes (Region).

Simultaneous linear OLS regression was used to answer RQ3. 2,649 HEIs were analyzed, which was 235 fewer HEIs than RQ1 and RQ2. This was because a HEI had to enroll at least one international student in the 2018/2019 academic year to be included. Robust errors were used in RQ3 to account for heteroscedasticity, so effect sizes were unable to be calculated. However, the lower and more stringent *p* values show that the variables are indeed significant.

The model for RQ3s and RQ4 was: $y_{sit} = \alpha_0 + \beta_1 (\mathcal{W}_{si}) + \beta_2 (\mathcal{X}_{si}) + e$. More details about the model can be found in Chapter 3.

Results

All of the variables accounted for a significant 55% of the variance, F (23, 2,625) = 193.63, MSE =1.32, p<.001. All main predictors were significant except unemployment rate. This included tuition (b=0.00003, p<.001), GDP (b=0.0000001, p=.040), ranking (b=0.12, p<.001), and OPT (b=0.0009, p<.001). A one-dollar increase in tuition corresponded to a .003% increase in ISE, or more clearly, a $1,000 increase in tuition correlated to 3% more international

students. For ranking, a one category change related to 12% higher ISE. For OPT, each additional student on OPT correlated to a .08% increase.

Total student enrollment (b=0.00006, p<.001) was significant, but graduate and STEM student enrollment were not significant. Categorical control variables were entered in as dummies to examine each group's importance and were compared against the category that had closest to the mean ISE overall. When compared with HEIs in the town category, city (b=0.41, p<.001) and suburb (b=0.32, p<.001) enrolled more international students, while HEIs classified as rural (b=-0.26, p=.004) had significantly smaller ISE. A public institution (b=0.92, p<.001), was highly different from private institutions in terms of its ISE. This meant that public institutions enroll 92% more international students with other factors held constant. Using CC as a control variable, CC2 (High Research Activity Doctoral Universities and other Doctoral/Professional Universities) and CC1 (Very High Research Activity Doctoral Institutions) were not significantly different in its ISE. However, CC3 (Master's Colleges and Universities, and Baccalaureate Colleges) (b=-0.95, p<.001) and CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) (b=-1.65, p<.001), had significantly smaller international student populations than CC2. Table 16 provides detailed information about all analysis and results for RQ3.

Table 16

The Role of Ranking, OPT, Tuition, and Economic Conditions in International Student Enrollment in 2019

Variable	*b*	SE	*t*	*β*	*p*
Tuition	0.00003	0.000004	8.75	0.24	0.000***
GDP	0.0000001	0.00000005	2.06	0.04	0.040*
Unemployment Rate	-0.05	0.06	-0.87	-0.02	0.387
Ranking	0.12	0.03	3.95	0.08	0.000***
OPT	0.0009	0.0002	4.00	0.13	0.000***
Total Student Population	0.00006	0.000008	8.28	0.41	0.000***
Graduate Students	-0.00004	0.00003	-1.10	-0.06	0.273
STEM Students	-0.0001	0.00008	-1.88	-0.06	0.060
Suburb	0.32	0.09	3.76	0.07	0.000***
City	0.41	0.08	5.16	0.10	0.000***
Rural	-0.26	0.09	-2.86	-0.05	0.004**
Public	0.92	0.10	9.20	0.23	0.000***
Carnegie Category 4	-1.65	0.15	-11.31	-0.42	0.000***
Carnegie Category 3	-0.95	0.12	-8.20	-0.24	0.000***
Carnegie Category 1	-0.09	0.16	-0.60	-0.01	0.546
New England Region	-0.21	0.14	-1.51	-0.03	0.132
Mideast Region	0.09	0.09	1.01	0.02	0.311
Plains Region	0.23	0.12	1.98	0.04	0.048
Southeast Region	-0.15	0.09	-1.74	-0.03	0.081
Southwest Region	0.03	0.11	0.28	0.004	0.779
Rocky Mountains Region	-0.10	0.18	-0.56	-0.01	0.577
Far West Region	0.20	0.13	1.59	0.04	0.113
Puerto Rico Region	-0.71	0.55	-1.30	-0.02	0.195

n= 2,649

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

Summary

RQ3 examined the extent to which tuition, ranking, OPT, GDP, and the unemployment rate related to ISE in the 2018/2019 academic year. The predictors and control variables

explained 55% of the variance, which means it is a useful model to understand ISE influencers in the U.S. during the 2018/2019 year. Tuition was the most important predictor according to *t* value, with a one SD increase in tuition corresponding with a .24 SD increase in ISE. OPT was the next most important predictor, with a one SD increase in OPT connecting to a .41 SD increase in ISE. Ranking and GDP were less important, but statistically significant, nonetheless. The unemployment rate is the only main predictor that was not significant in predicting ISE. Most of the categorical control variables were significantly different in their ISE numbers between the categories, although there was no difference based on region.

Some hypotheses were supported, while others were not.

H_a1: *USNWR* ranking and ISE will have a positive relationship.

This hypothesis is confirmed, as ranking was positively and significantly correlated with ISE.

H_0 2: Tuition rates will not have a statistically significant effect on ISE.

The null hypothesis is rejected, because tuition was significantly influential for ISE.

H_a 3: GDP and ISE will have a positive relationship.

This hypothesis is technically confirmed, although when a more stringent $p<.01$ level is applied, it is not statistically significant.

H_a 4: ISE and unemployment rates will have a negative relationship.

This hypothesis is rejected, because although the direction is accurate, the results are not statistically significant.

H_a 5: OPT and ISE will have a strong positive relationship.

This hypothesis is confirmed, as OPT is significant at $p<.001$.

The Role of Ranking, OPT, Tuition, and Economic Conditions on ISE in 2019 as Differentiated by Carnegie Classification

The fourth research question examined how international student enrollment at U.S. higher education institutions related to HEI ranking, OPT, tuition, and economic conditions in 2019 differ by Carnegie classification. Similar to RQ2, four hypotheses were tested, with the addition of one regarding OPT:

- H_a 6: Ranking will be a significant predictor for CC1.
- H_a 7: Tuition will be a significant predictor for CC1.
- H_a 8: GDP will be a significant predictor for CC3 and CC4.
- H_a 9: Unemployment rate will be a significant predictor for CC3 and CC4.
- H_a 10: OPT will be a highly significant predictor for CC1 and CC2.

Analysis Details

OLS regression was used with CC added as a grouping variable. Puerto Rican (PR) HEIs were not included in these analyses because there were three or less HEIs in each CC that were located in PR. Several interesting differences were found when examining the results at different types of institutions.

Results

Tables 17, 18, 19, and 20 provide detailed information about all analysis and results for RQ4.

Tuition

Tuition was a significant predictor for all groupings except for CC1 (Very High Research Activity Doctoral Institutions). It was the most important predictor or close to the most important predictor for the models for CC2 (High Research Activity Doctoral Universities and other

Doctoral/Professional Universities): (b =0.00003, p =.001), and CC3 (Master's Colleges and Universities, and Baccalaureate Colleges) (b =0.00003, p <.001). It was still an important predictor for CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) (b =0.00002, p =.007). In all groups, higher tuition predicted more international students.

GDP

GDP was not a significant predictor for any of the CCs.

Unemployment Rate

CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) was the only group where the unemployment rate was a significant predictor, and it was of borderline significance (b=-0.18, p=.048). When the unemployment rate went up 1%, ISE went down 18%.

Ranking

Ranking was a significant predictor for non-doctoral institutions, including CC3 (Master's Colleges and Universities, and Baccalaureate Colleges) (b=0.10, p=.002) and CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) (b=0.53, p=.003). The correlation was positive for both, so a higher ranking corresponded to higher ISE.

OPT

Higher rates of OPT corresponded with higher ISE for CC3 (Master's Colleges and Universities, and Baccalaureate Colleges) (b=0.003, p=.002) and CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) (b=0.01, p=.001). In CC4 institutions, OPT was the strongest predictor in the model,

with a 1 SD unit increase in OPT corresponding to a 0.2 SD increase in ISE. OPT was not a significant predictor for doctoral institutions, which were CC1 (Very High Research Activity) and CC2 (High Research Activity and Other Doctoral Institutions).

Control Variables

RQ2 showed that some of the control variables looked differently based on the category. RQ4 added institutional funding type, region, and campus setting as control variables. STEM was the most important variable in the model for CC1 (Very High Research Activity Doctoral Institutions), (b=0.0002, p<.001), but was not significant for any other CC. Overall student enrollment was significant for CC1 (b=0.00001, p=.008), CC2 (b=0.00003, p<.001), and CC4 (b=0.00006, p<.001). Graduate student population was a significant variable for predicting ISE with CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) (b=0.0004, p<.001) and CC1 (Very High Research Activity Doctoral Institutions) (b=0.00002, p=.012).

In terms of the categorical control variables, there were several important findings. In relation to HEIs in towns, the campus setting made a difference for CC3 (Master's Colleges and Universities, and Baccalaureate Colleges) and CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges). For CC3, HEIs in rural locations (b=-0.39, p=.003) enrolled significantly fewer international students, while HEIs located in cities (b=0.31, p=.001) had higher ISE. For CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges), suburb (b=0.63, p<.001) and city (b=0.50, p=.001) HEIs were enrolled more international students. With the exception of CC1, public HEIs enrolled more international students: CC2 (b=0.56, p=.015), CC3 (b=0.98, p<.001), and CC4 (b=.96, p<.001). There were not as many differences when examining by

Region. In comparison to HEIs in the Great Lakes Region, which was close to the mean for the groups in terms of ISE, CC4 HEIs in the Far West (*b*=0.44, *p*=.012) were different. For CC1 (Very High Research Activity Doctoral Institutions), HEIs in the Southeast region enrolled 28% fewer international students, *(b*=-0.28, *p*=.014). In CC3 institutions (Master's Colleges and Universities, and Baccalaureate Colleges), the New England region enrolled 39% fewer international students (b =-0.39, p =.022)

Strength of the Overall Models

The variables selected for this analysis explained more of the variance for CC1 (Very High Research Activity Doctoral Institutions) and CC2 (High Research Activity Doctoral Universities and other Doctoral/Professional Universities) as opposed to the other two groups. However, it is important to note that the sample size in the four groups were very different, which likely impacted the interpretation of the data. CC1 (Very High Research Activity Doctoral Institutions) included 107 HEIs, CC2 (High Research Activity Doctoral Universities and other Doctoral/Professional Universities) included 172 HEIs, CC3 (Master's Colleges and Universities, and Baccalaureate Colleges) was 1,105 HEIs, and CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) was 1,265 HEIs.

For CC1 (Very High Research Activity Doctoral Institutions), the model accounted for 85% (R^2=.85) of the variance, *F* (19, 87) = 35.21, *MSE* =0.32, *p*<.001. For CC2 (High Research Activity Doctoral Universities and other Doctoral/Professional Universities), the model accounted for 62% (R^2=.62) of the variance, *F* (19, 152) =12.38, *MSE* =.77, *p*<.001. For CC3 (Master's Colleges and Universities, and Baccalaureate Colleges), the variables accounted for 40% (R^2=.40), *F (*19, 1085) = 22.51, *MSE* =1.17, *p*<.001, and for CC4

(Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges), it was similar at 42% (R^2=.42), F (19, 1245) =34.08, MSE =1.39, p<.001.

Table 17

RQ4 Analysis of Very High Research Doctoral Institutions – Carnegie Classification 1

Variable	*b*	SE	*t*	*β*	*p*
Tuition	0.000009	0.000007	1.30	0.15	0.197
GDP	-0.00000004	0.00000005	-0.65	-0.04	0.516
Unemployment Rate	0.05	0.06	0.79	0.04	0.435
Ranking	0.03	0.03	1.05	0.05	0.295
OPT	0.0001	0.00008	1.79	0.15	0.078
Total Student Population	0.00001	0.000005	2.69	0.28	0.008**
Graduate Students	0.00002	0.000009	2.56	0.18	0.012*
STEM Students	0.0002	0.00004	4.01	0.38	0.000***
Rural	0.13	0.25	0.54	0.04	0.593
Suburb	0.36	0.22	1.59	0.17	0.115
City	0.13	0.18	0.73	0.08	0.467
Public	-0.02	0.21	-0.08	-0.01	0.938
New England Region	0.14	0.17	0.85	0.06	0.399
Mideast Region	0.04	0.11	0.40	0.02	0.688
Plains Region	0.06	0.14	0.41	0.02	0.681
Southeast Region	-0.28	0.11	-2.51	-0.16	0.014*
Southwest Region	-0.17	0.15	-1.10	-0.06	0.275
Rocky Mountains Region	-0.21	0.16	-1.34	-0.05	0.183
Far West Region	0.002	0.15	0.02	0.001	0.988

n = 107

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

Table 18

RQ4 Analysis of Doctoral Universities: High Research Activities and Other Doctoral Universities – Carnegie Classification 2

Variable	*b*	SE	*t*	*β*	*p*
Tuition	0.00003	0.000009	3.53	0.34	0.001***
GDP	-0.00000005	0.0000001	-0.40	-0.03	0.690
Unemployment Rate	-0.07	0.08	-0.89	-0.05	0.377
Ranking	0.01	0.09	1.09	0.09	0.279
OPT	0.0003	0.0002	1.73	0.14	0.086
Total Student Population	0.00003	0.000009	3.78	0.34	0.000***
Graduate Students	0.00003	0.00003	1.15	0.08	0.251
STEM Students	0.0002	0.0001	1.91	0.16	0.058
Rural	0.34	0.20	1.70	0.04	0.092
Suburb	-0.24	0.25	-0.98	-0.09	0.329
City	0.09	0.21	0.42	0.04	0.676
Public	0.56	0.23	2.45	0.23	0.015*
New England Region	-0.23	0.22	-1.05	-0.05	0.296
Mideast Region	0.16	0.21	0.75	0.05	0.457
Plains Region	0.01	0.21	0.05	0.002	0.958
Southeast Region	-0.38	0.20	-1.87	-0.13	0.063
Southwest Region	-0.26	0.23	-1.12	-0.07	0.263
Rocky Mountains Region	-0.27	0.20	-1.35	-0.05	0.180
Far West Region	-0.01	0.27	-0.04	0.002	0.972

$n = 172$

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

Table 19

RQ4 Analysis of Master Colleges/Universities and Baccalaureate Colleges – Carnegie Classification 3

Variable	*b*	SE	*t*	*β*	*p*
Tuition	0.00003	0.000005	5.97	0.27	0.000***
GDP	0.0000001	0.00000007	1.83	0.07	0.068
Unemployment Rate	-0.05	0.08	-0.67	-0.02	0.502
Ranking	0.10	0.03	3.03	0.09	0.002***
OPT	0.003	0.001	3.10	0.24	0.002***
Total Student Population	0.00003	0.00002	1.74	0.23	0.083
Graduate Students	-0.00001	0.00005	-0.21	-0.02	0.833
STEM Students	0.0006	0.0003	1.56	0.13	0.119
Rural	-0.39	0.13	-2.99	-0.09	0.003**
Suburb	0.11	0.10	1.06	0.03	0.289
City	0.31	0.10	3.24	0.10	0.001***
Public	0.98	0.15	6.71	0.31	0.000***
New England Region	-0.39	0.17	-2.29	-0.07	0.022*
Mideast Region	-0.13	0.12	-1.10	-0.04	0.270
Plains Region	0.21	0.15	1.37	0.04	0.171
Southeast Region	-0.10	0.11	-0.88	-0.03	0.378
Southwest Region	0.15	0.16	0.95	0.02	0.340
Rocky Mountains Region	-0.52	0.29	-1.79	-0.05	0.073
Far West Region	-0.11	0.20	-0.58	-0.02	0.561

n= 1,105

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

Table 20

RQ4 Analysis of Baccalaureate/Associate Colleges, Associate Colleges, Special Focus Institutions, and Tribal Colleges – Carnegie Classification 4

Variable	*b*	SE	*t*	*β*	*p*
Tuition	0.00002	0.000006	2.68	0.09	0.007**
GDP	0.00000002	0.00000007	0.32	0.01	0.750
Unemployment Rate	-0.18	0.09	-1.98	-0.06	0.048*
Ranking	0.53	0.18	2.95	0.07	0.003**
OPT	0.01	0.003	3.34	0.20	0.001***
Total Student Population	0.00006	0.00001	5.48	0.39	0.000***
Graduate Students	0.0004	0.00007	5.93	0.14	0.000***
STEM Students	0.0002	0.0002	0.70	0.02	0.484
Rural	0.003	0.13	0.03	0.007	0.980
Suburb	0.63	0.16	3.89	0.14	0.000***
City	0.50	0.15	3.40	0.14	0.001***
Public	0.96	0.15	6.20	0.24	0.000***
New England Region	-0.17	0.23	-0.76	-0.02	0.445
Mideast Region	0.30	0.16	1.92	0.06	0.056
Plains Region	0.08	0.20	0.43	0.01	0.670
Southeast Region	-0.26	0.15	-1.74	-0.06	0.081
Southwest Region	-0.03	0.18	-0.18	-0.005	0.859
Rocky Mountains Region	0.25	0.27	0.94	0.02	0.348
Far West Region	0.44	0.18	2.52	0.10	0.012*

n = 1,265

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

Summary

RQ4 examined how CC was connected to the extent to which ranking, OPT, tuition, GDP, and unemployment rate related to ISE. Tuition was positively and strongly significant for all CC groups besides CC1 (Very High Research Activity Doctoral Institutions). The economic indicators played less of a role in answering this question, with the unemployment rate of

borderline significance for CC4. Similar to tuition, a higher ranking and higher OPT related to higher ISE, but only for CC3 (Master's Colleges and Universities, and Baccalaureate Colleges) and CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges). While none of the main predictors were significant for CC1, three of the control variables (overall enrollment, STEM, and graduate enrollment) were significant. Overall student enrollment and STEM was also significant for CC4.

There were a few notable differences between the different categories of institutional funding type, campus setting, and region for the different CCs. The model strength was best for CC1 (Very High Research Activity Doctoral Institutions) and CC2 (High Research Activity Doctoral Universities and other Doctoral/Professional Universities), suggesting that there may be other factors more important for CC3 (Master's Colleges and Universities, and Baccalaureate Colleges) and CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges).

H_a7 - H_a10 hypothesized that the predictors would behave differently for different CCs. H_a7, which examined the relationship between ranking and ISE for CC1, was rejected. Ranking was not a significant predictor for CC1, but it was for CC3 and CC4. This was different from RQ2. H_a8, which posited that tuition and ISE would have a significant relationship for CC1, was also inaccurate. Tuition was actually a positive predictor for all other CCs besides CC1, which was also contradictory to RQ2. H_a8, which examined GDP for CC3 and CC4, was rejected, because GDP was not a positive predictor for any CCs. H_a9, which looked at the relationship between the unemployment rate and ISE for CC3 and CC4, was marginally and partially confirmed. CC4 had a significant negative relationship that was of borderline significance. Finally, H_a10, which suggested that OPT would be a highly significant predictor for CC1 and

CC2, was resoundingly rejected. The opposite happened – OPT was a significant predictor for CC3 and CC4, but not CC1 and CC2. Overall, the hypotheses were much more accurate for the longitudinal analyses for RQ2, as opposed to this one-year analysis for RQ4. There also appears to be more significant and meaningful differences between CCs when looking longitudinally in RQ2, so there is a lot to unpack and understand from the findings of this study.

Chapter Summary

This study focused on the role that ranking, OPT, tuition, GDP, and unemployment rate played in predicting ISE for 2,884 institutions from 2008-2019, as well as how these factors looked differently depending on Carnegie classification. RQ1 and RQ2 were examined using time series regression, particularly an Arellano-Bond estimator through an autoregressive distributed lag model. Linear OLS regression was used to answer RQ3 and RQ4, which analyzed the variables for the 2018/2019 academic year, and included OPT in the analysis. Chapter 5 critically examines and synthesizes the major findings, as well as provides implications and recommendations for future research.

CHAPTER V

DISCUSSION

International student enrollment (ISE) has become a fundamental characteristic of world-class institutions, particularly exemplified in Anglophone and rapidly developing countries (Hauptman Komotar, 2019; Marginson, 2006). From 2001 - 2017, ISE increased 66% in the United States (IIE, 2019). In recent years, however, consistent growth has morphed into a slow decline (IIE, 2019), although OPT growth has helped to stabilize the international student population. As globalization has increased and the world has become more interconnected, a diverse, educated, and skilled workforce has become essential for 21st century success (Gesing & Glass, 2019). The United States received the most international students and highly skilled immigrants over the last century, which has increased productivity and innovation (Chellaraj et al., 2005). International students bring academic partnerships (Gesing & Glass, 2019), increased cultural understanding (Mamiseishvili, 2012), financial stability (Cantwell, 2015; Macrander, 2017a), and contribute to a more diverse student body. Today, the U.S. share of international students has dropped significantly as more countries create conducive conditions to welcome more international students, innovative workers, and entrepreneurial businesses (Sa & Sabzalieva, 2018). It is critical to understand the academic and economic factors that influence ISE, how they impact different types of higher education institutions (HEIs), and the structure of shifts of ISE in the United States as HEIs attempt to counteract the recent decline in international student enrollment. HEIs and federal and state policymakers need to work together to create immigration and employment policies that are conducive to welcoming international students that will make a positive impact on the institutions they attend and the areas where they live.

Data-driven, longitudinal, and comprehensive studies can illuminate important insights that can be used to help HEIs strategize and better prepare for a tumultuous future.

Purpose and Research Questions

Numerous empirical studies have examined international students' motivations for attending college in the United States (Choudaha, 2017; Nicholls, 2018; Ruiz, 2014; Shen, 2016; Van Alebeek & Wilson, 2019). This study contributes to the growing body of research about international student mobility (Kondakci et al., 2018; Wei, 2013), the responses and rationales of institutions for ISE (Alfattal, 2017), and how economic conditions and immigration policies may impact ISE (Grimm, 2019). Most empirical studies take a small-scale view of the issue, either by examining ISE for one or two years, focusing on a certain type of institution or students from a certain country, or examining international students' decision making at one institution. The purpose of this *ex-post-facto* study was to examine the extent to which tuition, Optional Practical Training (OPT), unemployment rates, Gross Domestic Product (GDP), and the *US News and World Report* (USNWR) rankings related to ISE at HEIs in the United States, by examining data from 2004 to 2019 differentiated by institutional type. This study examined the influence of academic and economic factors over 12 years by focusing on 2,884 individual HEIs. The predictors were indicators that allowed for a structural examination of the main reasons international students choose to study in the United States as indicated by empirical research (Grimm, 2019; Han et al., 2015; Loo et al., 2017; Mazzarol & Soutar, 2002; Nicholls, 2018).

The following research questions guided the study:

- RQ1: How does international student enrollment at U.S. higher education institutions relate to ranking, tuition, GDP, and the unemployment rate from 2008 to 2019?

- RQ2: How does international student enrollment at U.S. higher education institutions relate to ranking, tuition, GDP, and the unemployment rate from 2008 to 2019 when differentiated by Carnegie classification?
- RQ3: How does international student enrollment at U.S. higher education institutions relate to ranking, Optional Practical Training rates, tuition, GDP, and the unemployment rate in 2019?
- RQ4: How does international student enrollment at U.S. higher education institutions relate to ranking, Optional Practical Training rates, tuition, GDP, and the unemployment rate in 2019 when differentiated by Carnegie classification?

Methodology

I used an *ex-post-facto* quantitative approach to examine the correlation of ranking, postgraduate employment, tuition, and economic conditions on ISE in the United States. Since this study examines how multiple factors relate to ISE over time, the use of existing data was an appropriate method to achieve the study goals. Data were retrieved from four different government agencies and one media company. A HEI in the United States was included in this study if: (a) it enrolled at least one international student from 2003/2004 to 2018/2019 (or just 2018/2019 for RQ3 & RQ4); (b) was degree-granting; (c) was non-profit; and (d) was located in one of the 50 states, the District of Columbia, or the Commonwealth of Puerto Rico. This equated to 2,884 HEIs for RQ 1 and RQ2, and 2,649 institutions for RQ 3 and RQ4. A total of 14,156,382 international students studied in the United States during the 16-year study time period.

Time series regression, particularly an Arellano-Bond estimator for an autoregressive distributed lag model, was used to answer RQ1 and RQ2. I used a four-year lag for all predictors

and outcome variables to account for the different entry time points of an international student population at a HEI, as well as the delayed nature of information used for college decision-making. RQ3 and RQ4 were examined by linear OLS regression for the variables in the 2018/2019 academic year, which included OPT in the analysis. Results were also analyzed by Carnegie classification to better understand the distinctions that the predictors may have on difference types of institutions.

Summary of the Findings

The academic and economic factors selected for this study were chosen based on a thorough literature view and integration of the World Systems and Human Capital Theories. The strength of the overall models, particularly as quantified by the R^2s in RQ3 and RQ4, show that these factors are indeed incredibly important for international students' decision making. Table 21 offers a visual overview of the findings for the different Carnegie classifications.

Descriptive Statistics

Descriptive statistics showed that international students disproportionately enroll at doctoral research institutions with the highest research activity, also known as Research 1 institutions, or Carnegie classification 1 (CC1) in this study. CC1 institutions comprised only 3.57% of HEIs but accounted for 36.4% of all ISE in the 16-year timeframe. This discrepancy became more profound over time, as Figure 11 in Chapter 4 demonstrated. HEIs located in cities disproportionally enrolled more international students, as did highly ranked or public institutions. The overall mean for ISE percentage during the 16-year time period was 3.53%, which increased from 3.06% in 2004 to 4.35% in 2019.

The Role of Ranking, Tuition, and Economic Conditions on ISE from 2008-2019

Time series regression with a four-year lag was used to analyze 2,884 institutions. Main findings included that previous years of ISE were highly correlated to the current year's enrollment numbers. Ranking was only significant at the first lag, where a higher ranking actually related to less ISE. Tuition was not a significant variable at any of the lags. GDP and the unemployment rate were moderately significant in the model, although the different lags often predicted negative ISE for one lag, and positive ISE for another lag. Of the control variables, higher STEM enrollment correlated with lower ISE, and higher overall enrollment corresponded with higher ISE.

The Role of Ranking, Tuition, and Economic Conditions on ISE from 2008-2019 Differentiated by Carnegie Classification

When broken down by CC, the results showed how the variables behaved differently at different types of institutions. For lagged ISE, CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) was the most related to the previous years' ISE. The economic factors - unemployment rate and GDP - were significant at later lags for some CCs, but often in differing, contradictory directions. Tuition was correlated in later lags on CC1 (Very High Research Activity Doctoral Institutions) and CC3 (Master's Colleges/Universities, and Baccalaureate Colleges). There were two predictors and one control variable – tuition, ranking, and STEM enrollment – that had opposite relationships for different types of institution. A higher ranking, tuition, and STEM enrollment related to a higher ISE for CC1 (Very High Research Activity Doctoral Institutions), but a lower ISE for CC3 (Master's Colleges/Universities, and Baccalaureate Colleges), and CC4 (Baccalaureate /Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) for STEM.

The Role of Ranking, OPT, Tuition, and Economic Conditions in ISE in 2019

RQ3 added OPT as a predictor, as well as the fixed effect control variables of region, campus setting (Urban, rural, town, or rural), and institutional funding type (public or private). RQs 3 and 4 were also only examined for the 2018/2019 year due to availability of OPT data. Four out of five predictors were significant in this model, including tuition, OPT, ranking, and GDP, listed in descending order of importance. Campus setting, institutional funding type, and Carnegie classification were also significantly different from the mean reference dummy variables, but there were not differences based on the U.S. region. The variables accounted for an overall 55% of the variance in the model.

The Role of Ranking, OPT, Tuition, and Economic Conditions on ISE in 2019 as Differentiated by Carnegie Classification

Interestingly, the results as differentiated by CC for 2018/2019 often diverged from the longitudinal analysis. Tuition was positively and strongly significant for all CC groups except CC1 (Very High Research Activity Doctoral Institutions). Higher ranking and OPT corresponded to higher ISE for CC3 (Master's Colleges/Universities, and Baccalaureate Colleges) and CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges). Three control variables (overall enrollment, STEM, and graduate students) accounted for the most variance in the model for CC1. The strength of the models was better for CC1 (Very High Research Activity Doctoral Institutions) (R^2=.85) and CC2 (High Research Activity Doctoral Universities and other Doctoral/Professional Universities) (R^2=.62), but still accounted for a large proportion of the variance in CC3 (Master's Colleges/Universities, and Baccalaureate Colleges) (R^2=.40), and CC4 (Baccalaureate/Associate's Colleges, Associate's Colleges, Special Focus Institutions, and Tribal Colleges) (R^2=.42).

How the Results Connect to Previous Research

The timeframes of the analyses were chosen intentionally, with a goal to understand how academic and economic factors connected to different types of HEIs during a time of great shifts in ISE. The 2008-2019 analyses encompassed both Obama presidential administrations (and the beginning of the Trump administration) during which OPT was expanded, a more positive rhetoric was taken toward immigrants and international students, and the post-recession recovery led many HEIs to prioritize international recruitment (Macrander, 2017a; Shen, 2016). Descriptive ISE data showed a reversal and slow decline in international student enrollment that began at the very end of the Obama administration, and continued through the Trump administration. Even with the changes in ISE and presidential administration, the factors tested in this study continued to be important, although certain institutions have been impacted in vastly different ways in recent years. As this study shows, the decline in ISE has been unevenly distributed, with non-doctoral, lesser ranked, and rural institutions more impacted.

Ranking

Ranking was used as a proxy for academic quality, which has been found consistently to be a major reason that international students choose to study in the United States (Branco Oliveira & Soares, 2016; Hauptman Komotar, 2019; Hazelkorn, 2014; Souto-Otero & Enders, 2017). Rankings are a good measure of overall academic quality because they rate institutions based on graduation and retention rates, faculty resources, and reputation, which can often translate to more job opportunities for graduates (Morse et al., 2019). Although rankings systems are undoubtedly flawed, they do measure metrics that signify that a students' financial investment in the institution is more likely to result in gainful employment and a rewarding experience.

Several studies (Branco Oliveira & Soares, 2016; Komissarova, 2020; Krsmanovic & Sabina, 2020; Shen, 2016) demonstrated that higher-ranked schools enroll larger numbers of students, and often charge higher tuition fees. This was particularly true at prestigious public institutions, which have been eager to make up budget deficits by enrolling more international students (Krsmanovic & Sabina, 2020; Shen, 2016). A recent report that examined longitudinal ISE data published by NAFSA, APLU, and INTO (Bukenova et al., 2020), found that the top 50 ranked HEIs experienced consistent ISE growth from 2007-2018, but lower ranked HEIs had declines. Graduates from higher-ranked schools typically go onto graduate programs and find gainful employment at higher rates than other types of HEIs (Campbell et al., 2019; Ortagus, 2016). This connects with studies that find that many international students view prestige and academic quality as an effective way to improve their economic standing (Perkins & Neumayer, 2014; Rafi, 2018), which may be expected and desired from their family (Hazelkorn, 2014; Souto-Otero & Enders, 2017). Data showing that highly internationalized universities also have higher rankings may show the snowball effect of ISE and ranking, and how they are interwoven together (Altbach & Knight, 2007; Delgado-Márquez et al., 2013).

This study confirmed much of the research that has found that rankings are important to international students, and that the majority of international students choose to enroll in highly ranked universities. However, the type of institution appears to be of critical importance, at least when examining data over 12 years. In this study, 20% of overall ISE was directed toward the top 50 ranked colleges and universities, which only represented 3.5% of HEIs. In the 12-year analysis, a higher ranking corresponded with significantly higher ISE, but only for the highest research activity doctoral institutions (CC1). A higher ranking actually negatively corresponded with ISE for master's, baccalaureate, special focus, and associate institutions (CC3 and CC4). In

the 2018/2019 analysis, an improvement of one ranking category corresponded with 12% more international students when examining all HEIs, which may show that rankings are becoming more important as HEIs seek to distinguish themselves and stand out to international students. Differential influence of rankings in the longitudinal analysis may indicate that non-doctoral institutions should focus on other factors to attract international students, and not chase prestige. However, focusing on the building blocks that comprise rankings (faculty resources, retention, graduation rates, a competitive student class) are worthwhile investments for all HEIs to make regardless of how the rankings may translate.

Tuition

It is well documented that tuition has continued to rise in the United States (NCES, 2017), that international students are often charged higher tuition and fees (Krsmanovic & Sabina, 2020), and that many HEIs prioritized ISE as a way to increase revenue (Macrander, 2017a). However, there is little to no empirical evidence that examines how tuition relates to ISE. It is impossible to know how many students or which type of students choose not to enroll in the United States because of the costs. College tuition in the United States is often two to three times higher than similar HEIs in other countries like Italy, South Korea, the Netherlands, and Germany (OECD, 2019). One study and one report discussed how increased tuition and fees make it difficult to attend college in the United States (ITA, 2016; Krsmanovic & Sabina, 2020), and many international students often share that financial challenges are a burden to them (IIE, 2015; Loo et al., 2017). A study focused on domestic students (Zhang, 2007) found that tuition did not impact enrollment, and Chen and colleagues (2019) found based on their longitudinal analysis of one institution that tuition did not relate to enrollment. Research by Bowman and

Bastedo (2009) found that for highly ranked liberal arts colleges, higher tuition corresponded to higher overall enrollment.

This study is in line with other studies that have found that tuition and enrollment are not significantly connected (Chen et al., 2019; Zhang, 2007), based on the 12-year analysis that includes all HEIs. But there are significant differences when examining the different CCs. When broken down by type of institution, higher tuition corresponded to higher ISE for high research activity doctoral institutions (CC1), but higher tuition negatively related to ISE at master, baccalaureate, special focus, and associate HEIs (CC3 and CC4). This may be due to an underlying influence of a market segment mindset – students are willing to pay higher tuition when they think it will translate to more prestige, employment opportunities, or connections. However, more expensive tuition at a non-doctoral institution may not be viewed as an investment that is as likely to pay off in the same way at a prestigious institution. When the most recent year (2018/2019) was examined, tuition was a positive predictor for ISE when examining all institutions. An interesting finding, unique to this study because of the data analysis technique, is that it was only in later lags that tuition was found to be a significant predictor for the 12-year analysis when examining different CCs. This could speak to the time it takes for tuition to affect enrollment decisions, or how tuition affects students at different points in their journey.

Economic Indicators

Many studies have found that international students often choose to study in economically prosperous countries (Marginson, 2006; Musumba et al., 2011), but few studies have actually tested how economic indicators like GDP and unemployment rate may connect to enrollment. In a recent and rare study that did examine how local unemployment factors

correlated with enrollment, Chen et al. (2019) did not find any connection. Another recent study by Komissarova (2020) found that states with better financial health enrolled more international students during the last 15 years. Many studies (i.e. Popadiuk & Arthur, 2014; Wei, 2013) have found that international students choose the United States for career and job potential, which connects to the economic benefits of studying in the United States (Nicholls, 2018). That may indirectly connect to the prosperity of the state or region, which is why it was important to test economic factors.

My study found support for the connection of stronger economic factors relating to higher ISE, but it also found the opposite. While there was no discernable correlation of GDP or unemployment when looking at the 2018/2019 analysis, some GDP or unemployment rate lags in the 12-year analysis were connected to ISE. However, the fact that in one lag, lower unemployment related to higher ISE, and in another lag, it related to lower ISE, indicates that something is going on beyond what these economic indicators can tell.

There are other potential economic indicators like the employment rate, inflation, or the consumer index that could provide more consistent evidence. During the time period that was analyzed for this study, the United States entered an economic recession and began a long recovery, which affected states and regions unevenly. This could be a reason why the economic indicator findings were contradictory. Additionally, a higher unemployment rate often corresponds to lower-skilled jobs that are lost, which are not typically the type of jobs that international students seek or will obtain. More longer-term research needs to be conducted to better understand the connection between economic factors and ISE.

Optional Practical Training

OPT has been an important vehicle for international students to gain work experience, which is one of the major appeals of studying in the United States (Loo et al., 2017). OPT has been relatively protected from immigration mandates in recent years, and fortunately a lawsuit that challenged the validity of the program was recently struck down (Redden, 2019; 2021). There are many pontifications from policymakers, advocates, and practitioners who warn that the end of OPT would effectively be the end of an era for U.S. international student recruitment (Redden, 2019). At a time when many other countries are opening their borders and immigration opportunities for international students (Grimm, 2019), it has become harder for international students to work in the United States. Although this study did not directly examine immigration policies or rhetoric, there is some evidence that policies and rhetoric influence ISE or alumni choosing to stay in the United States. Several studies have found in an increase in negative rhetoric from governmental leadership were connected with declines in applications from targeted groups (Van De Walker & Slate, 2019), that OPT has become more difficult to obtain (Pottie-Sherman, 2018), and that immigration challenges led alumni to leave the United States (Gesing et al., 2021).

Research has shown that increased employment and immigration opportunities can lead to increased ISE both in the United States and in other countries (Ilieva, 2017). Although empirical research has not examined how OPT connects to enrollment, there is some related research that examines how OPT connects to students' likelihood to remain in the United States, or how the H-1B visas relate to international student enrollment. Demirci (2019) found that the initial STEM OPT extension in 2008 connected to more students staying in the United States temporarily after graduation and taking advantage of the program (Demirci, 2019). Shih (2016)

found that a decrease in the H-1B cap was connected to reduced international student numbers, particularly from certain countries. Ruiz (2014) examined how students who used OPT often stayed in the same metro area as their HEI, and Ruiz and Budiman (2018) found that participation in the OPT program exponentially increased 400 percent from 2008 to 2016 after the STEM extension was implemented.

This study is the first empirical analysis I am aware of that attempts to understand how OPT relates to ISE. OPT was the second most important predictor in the 2018/2019 overall model (RQ3) after tuition, with essentially the same significance as ranking. When examining the different types of institutions, OPT rates at master, baccalaureate, special focus, and associate institutions (CC3 and CC4) were particularly important, serving as the first or second most important predictor in the model for 2018/2019. This can support the idea that when these HEIs are able to work with enrolled international students to obtain work authorization and employment, more prospective international students tend to enroll. This supports the argument of the importance of employment for international students' HEI decision making.

Other Important Institutional Variables

Campus Setting

A HEI's national location has shown to be an important factor for international students (Rafi, 2018). Often students choose the country where they want to study before they even consider the HEI (Marginson, 2006; Souto-Otero & Enders, 2017). However, little research has been conducted to understand the role that HEI location plays beyond the country. Nicholls' (2018) analysis found that few other studies listed city or state as important to international students' decisions, which she supported with her study results. However, there appears to be a difference for institutions that have name recognition, where students are keen to attend no

matter its specific location. Similar to many other countries worldwide, urban areas are quickly becoming epicenters of wealth and job growth. By 2030, 60% of the world's population is projected to live in an urban area (UN, 2018). Ruiz (2014) found that 2008 to 2012, 85% of international students attended a HEI in one of 118 cities, with a third of those students concentrated in only ten different cities (Ruiz, 2014). He also noted that cities which had a number of smaller HEIs benefitted from their location and enrolled more international students in comparison to small cities or towns with large land-grant HEIs with massive ISE.

In this study, there were large and significant differences between HEIs that were located in a city, suburb, town, or rural campus setting. Being located in a city in particular was incredibly important for baccalaureate, associate, and special focus institutions (CC4). Figures 5 through 8 in Chapter 4 provide a stark visual of the differences in the means in ISE for HEIs based on their CC and location from 2004-2019. Although campus setting was not able to be tested in the 2008-2019 analysis due to the fixed effect model, the descriptive data lends credence to the assertion that HEIs in cities have fared better over time. Practically speaking, a non-doctoral institution could counteract a lower ranking by emphasizing their urban location, or even partnering with organizations and other institutions in an urban location that is diverse and has more job opportunities.

Institutional Funding Type

Although large, prestigious, private HEIs often top the ISE list, public institutions are actually much more likely to enroll international students. This is likely intensified due to the pressure that public institutions have felt with a declining domestic population, as well as budget cuts in the last 20 years (Macrander, 2017a; Shen, 2016). Research has shown that budget cuts correlated with increased recruitment at ISE, particularly at many public institutions that became

very tuition dependent (Macrander, 2017a; Shen, 2016). Prestigious public institutions often charger higher tuition and attract international students (Komissarova, 2020; Krsmanovic & Sabina, 2020; Shen, 2016). The influence of a HEI's institutional funding type was not able to be tested over time due to the analysis techniques, but for 2018/2019, public and private institutions' ISE were highly different. In fact, if a HEI was public, it corresponded with 92% more ISE overall (RQ3). This was true for all types of institutions, except for the highest research activity doctoral institutions (CC1).

Differences Based on Carnegie Classification

As Chapters 4 and 5 have demonstrated, the relationship between the analyzed variables and ISE often differed greatly based on the type of HEI. Table 21 offers a visual depiction of the variables' influence based on Carnegie classification, as it corresponds to the two different time periods of analyses (2008-2019 vs. 2018/2019). In the figure, the variables are segmented based on external factors (ranking) that are not able to be directly changed, adjustable institutional characteristics (tuition, STEM enrollment, graduate enrollment, overall enrollment, and OPT), and fixed institutional characteristics (GDP, unemployment rate, campus setting, funding type, and region). Although the adjustable institutional characteristics are not necessarily easy to change, they are somewhat within the HEI's control. As an example, most students who apply for OPT are approved, but they need to know how and when to apply. They also need to be able to find a job, which HEIs can work intentionally with students to achieve.

Here one can see that for CC1 (Very High Research Doctoral), ISE is influenced by the factors in predictable ways, and all segments are influential. For CC2 (High Research Doctoral & other Doctoral/Professional Institutions), significant differences are only evident in the 2018/2019 analysis, and mostly for adjustable institutional characteristics. The effect of the variables on CC3 (Master & Baccalaureate Institutions) vary based on the one-year analysis or the 12-year analysis, with the one-year analysis showing a positive relationship between three main predictors and four control variables. CC4 (Baccalaureate/Associate, Associate, Special Focus, and Tribal Institutions) seems to be most broadly influenced by the different variables, particularly in the 2018/2019 analysis.

Table 21

Results by Carnegie Class

	Carnegie Classification	CC1: Very High Research Doctoral Institutions	CC2: High Research Doctoral, & other Doctoral/ Professional Institutions	CC3: Master & Baccalaureate Institutions	CC4: Baccalaureate/ Associate, Associate, Special Focus, and Tribal Institutions
External Factors	Ranking	++		+ ooo	ooo
Adjustable Institutional Characteristics	Tuition	+	ooo	++ ooo	oo
	Graduate	o			ooo
	STEM	ooo		+	++ ooo
	Enrollment	+++ oo	ooo		++
	OPT*			ooo	ooo
Fixed Institutional Characteristics	GDP	++			++
	Unemployment Rate	+++	++		+
	Campus Setting*			ooo	ooo
	Funding Type*		o	ooo	ooo
	Region*				

+ (2008-2019 analysis): + - significant; ++ - moderately significant; +++ - very significant

o (2018/2019 analysis): o – significant; oo - moderately significant; ooo - very significant

*: Only tested in 2018/2019 analysis

Note. Green indicates a positive relationship; Red indicates a negative relationship; Purple indicated a difference based on lag or category

Summary

This study connected to previous empirical research and literature in many ways, but also clarified and expanded understanding of how the selected predictors influence ISE in the United States. As other studies have found (Bowman & Bastedo, 2009; Bukenova et al., 2020), ranking is important for enrollment and in college choice, but it appears to be more important for different types of institutions. This study examined the connection of ranking to ISE for non-doctoral or non-prestigious institutions, which has rarely been done. Tuition was found to be an important predictor of ISE, but it looked differently for different types of institutions. Higher tuition connects with higher ISE at doctoral institutions, but it can be a deterrent at other institutions. This novel analysis of OPT showed that the number of students using OPT is important for enrollment, particularly at non-doctoral institutions. The findings were inconclusive about the influence of economic factors, which is mostly in line with the few studies that have also examined economic indicators. Lastly, this study provided evidence that an urban location is important for higher levels of ISE. Overall, this comprehensive and longitudinal analysis provided many insights about ISE that extends beyond many studies that examined one institution or a small subset of institutions.

Connection to World Systems and Human Capital Theories

The results showed that types of institutions fared differently with how tuition, ranking, economic factors, and OPT related to their ISE. One such example is that higher tuition corresponded with higher ISE for doctoral institutions with the highest research activity (CC1),

but with lower ISE for non-doctoral institutions in the 12-year analysis. The often-told story of ISE in the United States is that ISE increased exponentially after the great recession of 2008/2009 until 2016, which led many HEI faculty and staff scrambling to provide services and adapt their classroom instruction. However, the boom was mostly at certain types of institutions.

The World Systems Theory (WST) was used to frame this study, which describes how core countries funnel trade and commodities from periphery countries (Wallerstein, 2004). The WST is a good model for U.S. ISE on a macro and micro level. The United States has benefitted greatly from international students, including the diversity, culture, and partnerships that they bring. HEIs and policymakers often focus on the financial benefits, which NAFSA estimated as 41 billion dollars in 2019 (NAFSA, 2019). HEIs quickly adapted to use international student enrollment revenue to fund other streams. This reliance on ISE has caused a number of challenges in recent years when enrollment slowed, and certainly in the past year when enrollments have plummeted due to COVID-19 (IIE, 2020c).

Many other core and semi-periphery/developing countries have also grown their ISE, aiding its economic and intellectual growth. This study confirmed other analyses that show that ISE is influenced by strong economic and academic structures, which international students often prioritize in their decision-making process (Mazzarol & Soutar, 2002). Although mobile students temporarily leave their countries for better opportunities for themselves and their families, when they stay in the United States or do not return home, their home country often suffers from "brain drain" (Gesing & Glass, 2019). This perpetuates the cycle that WST hypothesizes, and will continue to increase inequality worldwide. However, when U.S. HEIs intentionally or unintentionally enroll fewer international students, whether because of a lack of economic opportunity, immigration policies, or high tuition prices, it reshapes the global economy in the

process. These students often shift either toward other core countries or to their home country, which improves the economic standing of the receiving country. Although this may be seen as a perceived loss for the United States, it could lead to more equality and global partnerships. As ISE continues to regionalize and diversify, it will be fascinating to see the long-term impact ISE has on the global economy and power structures.

On a mezzo-level such as the state or region, the WST may not play out in ways that were initially expected. Given that this study did not find practical significant differences between regions and state economic indicators, international students may be more drawn to specific cities or metro areas as opposed to the state or region.

On a micro-level, the unevenness of ISE evidenced by Carnegie classification and in urban areas, effectively perpetuates the WST within the United States. Prestigious and highly ranked HEIs tend to control the flow of knowledge production, have the best infrastructure, employ the most highly qualified staff, and lead globally in research and development (Macrander, 2017b; Marginson, 2006). As many HEIs have merged, closed, or had to shift their strategy, prestigious private and public flagship institutions have continued to grow their ISE or at least stay stable in recent years (Bukenova et al., 2020; IIE, 2019). International students prioritize institutions where they perceive a chance for economic gain, which is often found at a more prestigious, larger, well-connected institution in an urban area. As we enter a new era of higher education enrollment post-COVID and post-ISE losses, HEIs will need to capitalize on their strengths to ensure longevity.

The human capital theory (Becker, 1993) was also used to frame this study, which is exemplified by the results. When examining ISE through the human capital theory, it is posited that international students choose a college based on how they will benefit, increase their

economic potential, and acquire more capital. For example, the findings that OPT, tuition, and ranking connect to a higher ISE in the 2018/2019 analysis show that students prioritize an institution where they feel their investment will pay off. Therefore, an institution that charges higher tuition may be assumed to provide more resources and access for students. However, this may not be applicable at all institutions (as the longitudinal analyses indicates) – so it behooves institutions to tread lightly when increasing tuition and also trying to enroll more international students. Although the economic indicators (GDP and unemployment rate) were not consistent or statistically significant in many cases, the connection of students enrolling in urban areas with more job potential can point toward the importance of human capital. With a capital and market driven mindset, students will undoubtedly shift their enrollment decisions if other countries or HEIs are perceived to offer more benefits. The United States has rested on its laurels of high-quality higher education institutions and name recognition, but this may not be enough to withstand the changing tides like greater immigration and economic opportunities in other countries (Grimm, 2019), or the growth of well-resourced HEIs worldwide.

Implications

Higher education practitioners, leaders, scholars, and policymakers should be able to apply the results of this study in several ways. First, it points to the need for longitudinal research and new methods of analyses which examine how certain factors are influential at different times. This is true both for trends in ISE and longitudinal research in general, but also with time series techniques that test lags of certain factors. This could lead to a better understanding of how and when students access information, which can help policymakers and higher education administrators employ a big picture view to measure the effects of an action or change.

The findings of this study, current immigration challenges, and overall ISE trends also suggest that the United States may not be the predominant enroller of international students for much longer. Although the higher education capacity of the United States is unmatched elsewhere, many countries are altering their immigration policies and higher education environments to welcome international students because they recognize the benefit they bring. U.S. HEIs often have to fight against discriminatory policies like the travel ban, the lawsuit toward OPT, and the many microaggressions that international students face on a daily basis. Overall, international students seem to grasp that a government's policies do not speak for the citizens' feelings, but exclusionary policies have impacted ISE before (Ilieva, 2017; Van De Walker & Slate, 2019) and are likely to continue to do so. HEIs must join together to advocate for policies that welcome international students, as a group of HEIs did in July 2020 to oppose the ICE in-person class requirement (Gross, 2020). HEIs must also work with advocacy organizations to propose sensible immigration policies and translate the benefits of international students to those outside higher education. As articulated by the American Council for Education (ACE) President and other higher education leaders in November 2020, President Biden and the new Congress need to act quickly and ardently to counteract declines in ISE to maintain the "critical role international students play in creating campus environments that facilitate global learning for all students—domestic and international alike" (ACE, 2020, para. 3), and the United States' status as the "destination of choice for the world's most talented international scholars and students" (ACE, 2020, para. 4). There have been positive steps with the new presidential administration attempting to shore up OPT, but more proactive measures need to be taken at a federal level to ensure that international students are able to obtain visas easily, find employment, and stay and work in the United States if they so choose.

Another important implication is that institutional context matters. The results of the 12-year analysis looked very different depending on the type of institution. It has been assumed based on many studies that a higher ranking is important to international students and will lead to more ISE (Bowman & Bastedo, 2009; Branco Oliveira & Soares, 2016). While the 2018/2019 analysis seems to support this idea, the longitudinal analysis suggests that ranking is not as important for non-doctoral institutions and can actually hinder ISE. HEIs should carefully research and consider their individual context and student population before making important decisions.

While the results show that the highest research doctoral institutions (CC1) have been able to grow their ISE in the midst of continued challenges, the same is not true for other institutions. However, there are a number of strategies that non-research focused doctoral, master, baccalaureate, associate, special focus, and tribal institutions can employ. Moving up in the rankings takes a lot of financial and human resources and is not feasible for many institutions (Marginson, 2006). However, the results of this study and others (Loo et al., 2017; Musumba et al., 2011; Pham et al., 2019) show that students want to enroll at an institution that can lead toward gainful employment. HEIs can showcase the success and journeys of international alumni, partner with companies that hire international students, and provide resources to help international students become stellar job candidates. HEI visa and immigration offices can work with students from their first year to understand the OPT and CPT process.

Results showed that HEI location matters, particularly for non-doctoral institutions. HEIs that are in located in an urban area should maximize that attribute by partnering with companies, other HEIs, and highlighting the diversity of the area to potential students. HEIs that are not located in urban areas will need to be innovative in selling their institution to students who may

want to attend a school in an urban area with more opportunity. However, this can be accommodated by partnering with organizations, companies, and alumni that could lead to job opportunities and employment for international students.

COVID-19 has hit international education particularly hard, but enrollment declines began to occur before the pandemic (IIE, 2019; Martel, 2020). HEIs need to tap into their resources, run lean operations, and capitalize on the comfortability that students have developed toward learning and building community in a virtual environment. The time is ripe to build partnerships with international institutions and create culturally immersive virtual exchanges (Glass et al., 2021). Understanding that students prioritize employment opportunities (Loo et al., 2017), and leaning on the understanding that OPT is an important factor for HEIs that have experienced large declines, HEIs can work with international students through the life cycle, plug them into alumni networks, and provide effective career guidance and support (Glass et al., 2021). The era has passed where U.S. HEIs can rely on their national location and engage in minimal recruitment while still experiencing ISE growth. The current environment provides the opportunity for HEI leaders to think critically, innovatively, and build on their HEI's strengths and assets. This could include working closely with international alumni, developing partnerships with international and domestic secondary schools, creating micro-campuses and exchange agreements, and capitalizing on what makes their institution unique. New majors and curricula should be future facing, provide students with the skills to solve global problems, and focus on emerging fields. Now more than ever, HEIs must pivot toward emphasizing the uniqueness of their institution and build on their strengths, as opposed to chasing prestige or what highly ranked HEIs are doing.

Future Research

This idea for this research study was inspired by the need to comprehensively examine ISE in the United States during a time period where great shifts occurred alongside a number of significant national and worldwide events and different Presidential administrations. The results from this study inspire a number of potential directions. More studies should focus on enrollment factors that may be applicable to international students who enroll at non-doctoral institutions. Since the variables in this study are based off the preponderance of research conducted on international student motivations at doctoral institutions, it would be beneficial to understand why ISE looks differently at community colleges and less research-intensive four-year institutions. Secondly, the influence of campus setting and urban economic factors in certain major U.S. cities should be further examined to better understand the influence of a HEI's location. Lastly, this study should be replicated and extended after the main effects of COVID have dissipated, to better understand how HEIs fared during the current climate.

Conclusion

International student enrollment is both a product of globalization and simultaneously reshapes globalization in the process. Many U.S. HEIs have come to rely on ISE for their financial livelihood, and well as a means to reconfigure their student body to better match the multicultural composition of the United States in the 21st century. This study's aim was to understand the role that ranking, tuition, Optional Practical Training, GDP, and unemployment rate played in ISE over the last few decades. In particular, a major goal was to understand enrollment trends at non-doctoral institutions, which has been neglected in the literature. Results did indicate that important factors like tuition, ranking, and OPT often influence enrollment in different ways based on the type of institution.

COVID-19 has shaken the very core of many American structures and institutions, including higher education. Many HEIs are teetering on the brink of devastating and institution-altering budget cuts and challenges ahead. International education, international partnerships, innovative virtual practices, and ISE in particular can provide solutions for the challenges that face the field. HEI leaders need to be willing to think innovatively and focus on their HEI's unique and desirable attributes, as opposed to chasing prestige or modeling themselves after other colleges. As more countries increase their recruitment and incentives for international students, it is likely that these students will follow the path that leads to the best opportunity for themselves and their family. The United States is a better country because of its large international student population, but if recent trends continue, more international students may choose to study in other countries. HEI faculty and staff should work toward a more intentional and integrative future in higher education where HEIs not only recruit international students, but more importantly support students throughout the life cycle (Glass et al., 2021). It should not only be international students that are transformed because of their experience on a U.S. college campus, but the college itself that is also transformed in the process.

REFERENCES

Ahmad, S. Z., Buchanan, F. R., & Ahmad, N. (2016). Examination of students' selection criteria for international education. *International Journal of Educational Management, 30*(6), 1088-1103. https://www.doi.org/10.1108/IJEM-11-2014-0145

Alfattal, E. (2017). International students' college choice is different! *International Journal of Educational Management, 31*(7), 930-943. https://www.doi.org/10.1108/IJEM-05-2016-0095

Altbach, P. G. (2004). Globalisation and the university myths and realities in an unequal world. *Tertiary Education and Management, 10,* 3-25. https://www.doi.org/10.1023/B

Altbach, P. G., & Knight, J. (2007). The internationalization of higher education: Motivations and realities. *Journal of Studies in Higher Education, 11*(3/4), 290-305. https://www.doi.org/10.1177/1028315307303542

American Council on Education [ACE]. (2020, November 16). *Statement by ACE President Ted Mitchell on the Institute of International Education's 2020 fall international enrollment survey*. https:// www.acenet.edu/News-Room/Pages/Statement-by-ACE-President-Ted-Mitchell-on-the-Institute-of- International-Educations-2020-Fall-International-Enrollment.aspx

American Immigration Council [AIC]. (2020, April). *The H-1B visa program: A primer on the program and its impact on jobs, wages, and the economy.* https://www.americanimmigrationcouncil.org/research/h1b-visa-program-fact-sheet

Ammigan, R. (2019). Institutional satisfaction and recommendation: What really matters to international students? *Journal of International Students, 9*(1), 262-281. https://doi.org/10.32674/jis.v9i1.260

Anderson, N. (2020, November 16). Pandemic leads tens of thousands of international students to delay plans to enter U.S. colleges, survey shows. *The Washington Post.* https://www.washingtonpost.com/local/education/international-students-us-colleges-pandemic/2020/11/13/27e16a66-25d7-11eb-952e-0c475972cfc0_story.html

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies, 58*(2), 277-297. https://www.doi.org/10.2307/2297968

Ashley, R. A., & Parmeter, C. F. (2020). Sensitivity analysis of an OLS multiple regression inference with respect to possible linear endogeneity in the explanatory variables, for both modest and for extremely large samples. *Econometrics, 8*(11), https://www.mdpi.com/2225-1146/8/1/11/pdf

Becker, G. S. (1993). *Human capital: A theoretical and empirical analysis, with special reference to education* (3rd ed.). University of Chicago Press.

Beelen, J. (2011). Internationalisation at home in a global perspective: A critical survey of the 3rd global survey report of IAU. *RUSC: Universities and Knowledge Societies Journal*, *8(*2), 249-264. https://doi.org/10.7238/rusc.v8i2.1094.

Bègin-Caouette, O. (2013). Think locally, act globally: Comparing urban, suburban, and rural colleges' internationalization: The case of the CÉGEPS. *College Quarterly, 16*(4), 1-13. www.collegequarterly.ca

Bohman, E. (2014). Attracting the world: Institutional initiatives' effects on international students' decision to enroll. *Community College Journal of Research and Practice, 38*(8), 710-720. https://www.doi.org/10.1080/10668926.2014.897081

Bourdieu, P. (1986). The forms of capital. In J. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241-258). Greenwood.

Bowman, N., & Bastedo, M. (2009). Getting on the front page: Organizational reputation, status signals, and the impact of U.S. News and World Report on student decisions. *Research in Higher Education, 50*(5), 415–436. https://www.doi.org/10.1007/s11162-009-9129-8

Box-Steffensmeier, J. M., Freeman, J. R., Hitt, M. P., & Pevehouse, J. C. W. (2014). *Time series analysis for the social sciences*. Cambridge University Press.

Branco Oliveira, D., & Soares, A. M. (2016). Studying abroad: Developing a model for the decision process of international students. *Journal of Higher Education Policy and Management*, *38*(2), 126-139. https://www.doi.org/10.1080/1360080X.2016.1150234

Bukenova, D., Burrola, B., Contrata, K., Di Maria, D. L., Ng Hartmann, J., & O'Brien, T. (2020, October). *Factors influencing international student enrollment growth and decline: A multi-factor analysis of 2 decades of data with implications for the future*. NAFSA, APLU, & INTO. https://www.aplu.org/library/factors-influencing-international-student-enrollment-growth-and-decline-decline/file

Bureau of Economic Analysis [BEA]. (2003-2019). *Gross domestic product by state, fourth quarter and annual 2019.* (Annual GDP by State and Industry). [Data set]. https://apps.bea.gov/itable/iTable.cfm?ReqID=70&step=1

BEA. (n.d.) *Gross domestic product.* https://www.bea.gov/resources/learning-center/what-to-know-gdp

Bureau of Labor Statistics [BLS]. (2001). *What is seasonal adjustment?* https://www.bls.gov/cps/seasfaq.htm

BLS. (2003-2019). *Local area unemployment statistics* [Data set]. https://www.bls.gov/lau/

Cairns, D., & Sargsyan, M. (2019). *Student and graduate mobility in Armenia.* Palgrave Macmillan.

Campbell, C. M., Jimenez, M., & Arrozal, C. A. N. (2019). Prestige or education: College teaching and rigor of courses in prestigious and non-prestigious institutions in the U.S. *Higher Education, 77*(4), 717-738. https://www.doi.org/10.1007/s10734-018-0297-3

Cantwell, B. (2015). Are international students cash cows? Examining the relationship between new international undergraduate enrollments and institutional revenue at public colleges and universities in the US. *Journal of International Students, 5*(4), 512-525. https://doi.org/10.32674/jis.v5i4.412

Chen, Y. A., Li, R., & Hagedorn, L. S. (2019). Undergraduate international student enrollment forecasting model: An application of time series analysis. *Journal of International Students, 9*(1), 242-261. https://www.doi.org/10.32674/jis.v9i1.266

Chellaraj, G., Maskus, K. E., Mattoo, A. (2005). *The contribution of skilled immigration and international graduate students to U.S. innovation*. World Bank (WPS3588). https://openknowledge.worldbank.org/handle/10986/5511

Choudaha, R. (2017). Three waves of international student mobility (1999-2020). *Studies in Higher Education, 42*(5), 825-832. https://doi.org/10.1080/03075079.2017.1293872

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Lawrence Erlbaum Associates, Inc.

Crockett, S. A., & Hayes, D. G. (2011). Understanding and responding to the career counseling needs of international college students on U.S. campuses. *Journal of College*

Counseling, 14, 65-80. https://doi.org/10.1002/j.2161-1882.2011.tb00064.x

Cubillo, J. M., Sánchez, J., & Cerviño, J. (2006). International students' decision-making process. *The International Journal of Educational Management, 20*(2), 101-115. https://www.doi.org/10.1108/09513540610646091

Delgado-Márquez, B. L., Escudero-Torres, M. A., & Hurtado-Torres, N. E. (2013). Being highly internationalised strengthens your reputation: An empirical investigation of top higher education institutions. *Higher Education, 66*(5), 619-633. https://www.doi.org/10.1007/s10734-013-9626-8

Demirci, M. (2019). Transition of international science, technology, engineering, and mathematics students to the U.S. labor market: The role of visa policy. *Economic Inquiry, 57*(3), 1367-1391. https://doi.org/10.1111/ecin.12795

Depietro, A. (2020, June 2). Impact of coronavirus (COVID-19) on college tuition and finances. *Forbes*. https://www.forbes.com/sites/andrewdepietro/2020/06/02/impact-covid-19-tuition-finance/#22bd77974b88

Dill, D. D., & Soo, M. (2005). Academic quality, league tables, and public policy: A cross-national analysis of university ranking systems. *Higher Education, 49*(4), 495-533. https://www.doi.org/10.1007/s10734-004-1746-8

Durkee, A. (2020, July 24). New international students will be barred from entering U.S. for online-only learning, ICE says. *Forbes*. https://www.forbes.com/sites/alisondurkee/2020/07/24/new-international-students-will-be-barred-from-entering-us-for-online-only-learning-ice-says/#7eccc6611073

Feldblum, M., Hubbard, S., Lim, A., Penichet-Paul, C., & Siegel, H. (2020, April). Undocumented students in higher education: How many students are in U.S. colleges and universities, and who are they? *New American Economy/Presidents' Alliance on Higher Education and Immigration*. https://www.presidentsalliance.org/report-undocumented-students-in-higher-education-how-many-students-are-in-u-s-colleges-and-universities-and-who-are-they/

Findley, A. (2011). An assessment of supply and demand-side theorizations of international student mobility. *International Migration, 49*(2), 162-190. https://doi.org/110.1111/j.1468-2435.2010.00643.x

Fisher, K. (2020, January 10). Meet the new international student: Budget-conscious, job-focused, and maybe already in your backyard. *The Chronicle of Higher Education*. https://www.chronicle.com/interactives/20200110-new-international-student

Gallarza, M. G., Šerić, M., & Cuadrado, M. (2017). Trading off benefits and costs in higher education: A qualitative research with international incoming students. *International Journal of Management Education, 15*(3), 456-469. https://www.doi.org/10.1016/j.ijme.2017.08.001

Gesing, M., & Glass, C. (2019). STEM student mobility intentions post-graduation and the role of reverse push-pull factors. *International Journal of Educational Development, 65*, 227-236. https://www.doi.org/10.1016/j.ijedudev.2018.08.008

Gesing, P., Cruz, N. I., & Lynch, R. J. (2021). Global policy impacts on career outcomes: An international student mobility case study. In Glass, C. R. & Gesing, P. (Eds.), *Critical perspectives on equity and social mobility in study abroad: Interrogating issues of unequal access and outcomes*. Routledge.

Geverdt, D. E. (2015). *Education demographic and geographic estimates program (EDGE): Locale boundaries user's manual*. National Center for Education Statistics/Institute of Education Sciences. https://nces.ed.gov/programs/EDGE/docs/NCES_LOCALE_USERSMANUAL_2016012.pdf

Glass, C. R., Godwin, K. A., & Helms, R. M. (2021). *Toward greater inclusion and success: A new compact for international students*. American Council on Education. https://www.acenet.edu/Documents/Intl-Students-Monograph.pdf

González Canché, M. (2018). Geographical network analysis and spatial econometrics as tools to enhance our understanding of student migration patterns and benefits in the U.S. higher education network. *The Review of Higher Education, 41*(2), 169-216. https://www.doi.org/10.1353/rhe.2018.0001

Gribble, C. (2008). Policy options for managing international student migration: The sending country's perspective. *Journal of Higher Education Policy and Management, 30*(1), 25-39. https://www.doi.org/10.1080/13600800701457830

Grimm, A. (2019). Studying to stay: Understanding graduate visa policy content and context in the United States and Australia. *International Migration, 57*(5), 235-251. https://www.doi.org/10.1111/imig.12561

Gross, E. L. (2020, July 8). Harvard, MIT sue Trump Administration over ICE crackdown on foreign students. *Forbes.* https://www.forbes.com/sites/elanagross/2020/07/08/harvard-mit-sue-trump-administration-over-ice-crackdown-on-foreign-students/?sh=6887f0a168a4

Government of Canada. (n.d.). *Stay in Canada after graduation*. Retrieved July 10th, 2020, from https://www.canada.ca/en/immigration-refugees-citizenship/services/study-

canada/work/after-graduation.html

Han, X., Gebbie, M. A., & Appelbaum, R. (2015). Will they stay or will they go? International graduate students and their decisions to stay or leave the U.S. upon graduation. *Plos One, 10(*3), 1–18. https://doi.org/10.1371/journal.pone.0118183

Hauptman Komotar, M. (2019). Global university rankings and their impact on the internationalisation of higher education. *European Journal of Education, 54*(1), 299-310. https://www.doi.org/10.1111/ejed.12332

Hazelkorn, E. (2014). Reflections on a decade of global rankings: What we've learned and outstanding issues. *European Journal of Education, 49*(1), 12-28. https://www.doi.org/10.1111/ejed.12059

Ilieva, J. (2017, October). *Do political events in host countries affect international education engagement?* IDP: International Education Specialists, International Education Association of Australia. https://aiec.idp.com/uploads/pdf/PDFs%20AIEC%202017/Do_political_events_in_host_countries_affect_international_education_engagement_Dr_Janet_Ilieva_AIEC2017.pdf

Institute of International Education [IIE]. (2001-2019). *International students at all institutions, 2001/02-2018/19.* https://www.iie.org/Research-and-Insights/Open-Doors/Data/International-Students/All-Institutions/All-Institutions-Data

IIE. (2015). *What international students think about U.S. higher education: Attitudes and perceptions of prospective students from around the World*. https://www.iie.org/Research-and-Insights/Publications/What-International-Students-Think-About-US-Higher-Education

IIE. (2020a). *About: International student census.* http://opendoorsiie.wpengine.com/about/about-international-student-census/

IIE. (2020b). *FAQ.* https://www.iie.org/Research-and-Insights/Open-Doors/Frequently-Asked-Questions

IIE. (2020c). *International student enrollment trends, 1948/9-2019/2020.* https://opendoorsdata.org/

International Trade Administration [ITA]. (2016). *Top market report: Education.* https://legacy.trade.gov/topmarkets/pdf/Education_Top_Markets_Report.pdf

James-MacEachern, M. (2018). A comparative study of international recruitment–tensions and opportunities in institutional recruitment practice. *Journal of Marketing for Higher Education, 28*(2), 247-265. https://www.doi.org/10.1080/08841241.2018.1471014

Kelchen, R. (2018). *Higher education accountability*. John Hopkins University Press.

Knapp, L. G., Kelly-Reid, J. E., & Ginder, S. A. (2012). *2011-12 Integrated Postsecondary Education Data System (IPEDS) methodology report*. U.S. Department of Education. https://nces.ed.gov/pubs2012/2012293.pdf

Komissarova, O. (2020). *International student enrollment trends in the United States: Economic perspectives* [Unpublished doctoral dissertation]. Seton Hall University.

Kondakci, Y., Bedenlier, S., Zawacki-Richter, O. (2018). Social network analysis of international student mobility: Uncovering the rise of regional hubs. *Higher Education, 75,* 517-535. https://www.doi.org/0.1007/s10734-017-0154-9

Krsmanovic, M., & Sabina L. L. (2020). Resident, non-resident, and the other: Examining state policies for international student residency classification for tuition purposes and the associated cost of fees. *Journal of Education Finance.* Advance online publication.

https://www.press.uillinois.edu/journals/jef.html

Leedy, P. D., & Ormrod, J. E. (2019). *Practical research: Planning and design* (12th ed.). Pearson Education.

Loo, B., Luo, N., & Ye, Z. (2017, October). *Career prospects and outcomes of U.S.-educated international students: Improving services, bolstering success.* World Education Services. https://knowledge.wes.org/wes-research-report-career-outcomes

Macrander, A. (2017a). An international solution to a national crisis: Trends in student mobility to the United States post 2008. *International Journal of Educational Research, 82*, 1-20. https://doi.org/10.1016/J.IJER.2016.12.003

Macrander, A. (2017b). Fractal inequality: A social network analysis of global and regional international student mobility. *Research in Comparative & International Education, 12*(2), 243-268. https://doi.org/10.1177/1745499917712616

Malet Calvo, D. (2018). Understanding international students beyond studentification: A new class of transnational urban consumers. The example of Erasmus students in Lisbon (Portugal). *Urban Studies, 55*(10), 2142-2158. https://doi.org/10.1177/0042098017708089

Marginson, S. (2006). Dynamics of national and global competition in higher education. *Higher Education, 52*(1), 1-39. https://www.doi.org/10.1007/s10734-004-7649-x

Martel, M. (2020, July). *COVID-19 effects on U.S. higher education campuses: New realities for global student mobility in summer and fall 2020*. IIE. https://www.iie.org/Connect/COVID-19/COVID-19-Snapshot-Survey-Series

Mamiseishvili, K. (2012). International student persistence in U.S. postsecondary institutions. *Higher Education, 64*(1), 1-17. https://www.doi.org/10.1007/s10734-011-9477-0

Mazzarol, T., & Soutar, G. N. (2002). “Push-pull” factors influencing international student destination choice. *The International Journal of Educational Management*, *16*(2), 82-90. https://doi.org/10.1108/09513540210418403

McClure, K. R., & Titus, M. (2018). Spending up the ranks? The relationship between striving for prestige and administrative expenditures at U.S. public research universities. *The Journal for Higher Education, 89*(6), 961-987. https://doi.org/ 10.1080/00221546.2018.1449079

Mcmahon, M. E. (1992). Higher education in a world market. A historical look at the global context of international study. *Higher Education, 24*, 465-482.

Mitchell, N. (2020, March 26). *Five years to recover global mobility, says IHE expert.* University World News. https://www.universityworldnews.com/post.php?story=20200326180104407

Morse, R., Brooks, E., & Mason, M. (2019, September 8). *How U.S. News calculated the 2020 best colleges rankings.* US News and World Report. https://www.usnews.com/education/best-colleges/articles/how-us-news-calculated-the-rankings

Musumba, M., Jinb, Y. H., & Mjelde, J. W. (2011). Factors influencing career location preferences of international graduate students in the United States. *Education Economics, 19*(5), 501-517. https://doi.org/10.1080/09645290903102902

NAFSA: Association of International Educators [NAFSA]. (2019). *The United States of America benefits from international students.* https://www.nafsa.org/sites/default/files/media/document/isev-2019.pdf

NAFSA. (2020, May). *Survey: Financial impact of COVID-19 on international education*. https://www.nafsa.org/policy-and-advocacy/policy-resources/survey-financial-impact-

covid-19-international-education

National Center for Education Statistics [NCES]. (2017). *Tuition costs of colleges and universities*. Institute of Education Sciences. https://nces.ed.gov/fastfacts/display.asp?id=76

NCES. (n.d.-a). *About IPEDS.* https://nces.ed.gov/IPEDS/about-IPEDS

NCES. (n.d.-b). *Changes to IPEDS data collections, 2010-11*. https://nces.ed.gov/ipeds/report-your-data/archived-changes?year=2010-11.

NCES. (n.d.-c). *Definitions for new race and ethnicity categories.* https://nces.ed.gov/IPEDS/report-your-data/race-ethnicity-definitions

NCES. (n.d.-d). *FAQ.* https://surveys.nces.ed.gov/IPEDS_PY/VisFaqView.aspx?mode=reg&id=3&show=all

Ng, W. H., Menzies, J., & Ambika, Z. (2019). Facilitators and inhibitors of international postgraduate students' university-to-work transition. *Australian Journal of Career Development, 28*(3), 186-196. https://doi.org/10.1177/1038416219845392

Nicholls, S. (2018). Influences on international student choice of study destination: Evidence from the United States. *Journal of International Students, 8*(2), 597-622. https://doi.org/10.5281/zenodo.1249043

Organisation for Economic Co-operation and Development [OECD]. (2019). *Education at a glance 2019: OECD indicators*. OECD Publishing. https://doi.org/10.1787/f8d7880d-en.

Ortagus, J. (2016, July). Pursuing prestige in higher education: Stratification, status, and the influence of college rankings. *College and University, 91*(2),10-19.

Perkins, R., & Neumayer, E. (2014). Geographies of educational mobilities: Exploring the uneven flows of international students. *The Geographical Journal, 180*(3), 246–259,

https://www.doi.org/10.1111/geoj.12045

Pham, T., Tomlinson, M., & Thompson, C. (2019). Forms of capital and agency as mediations in negotiating employability of international graduate migrants. *Globalisation, Societies and Education*, *17*(3), 394–405. https://doi.org/10.1080/14767724.2019.1583091

Popadiuk, N. E., & Arthur, N. M. (2014). Key relationships for international student university-to-work transitions. *Journal of Career Development*, *41*(2), 122–140. https://doi.org/10.1177/0894845313481851

Pottie-Sherman, Y. (2013). Talent for citizenship and the American dream: The USA as outlier in the global race for talent. *Journal of International Migration and Integration, 14*(3), 557-575. https://www.doi.org/10.1007/s12134-012-0255-3

Pottie-Sherman, Y. (2018). Retaining international students in northeast Ohio: Opportunities and challenges in the 'age of Trump'. *Geoforum*, *96*, 32–40. https://doi.org/10.1016/j.geoforum.2018.07.015

Prazeres, L. (2018). At home in the city: Everyday practices and distinction in international student mobility. *Social and Cultural Geography, 19*(7), 914-934. https://doi.org/10.1080/14649365.2017.1323343

Quacquarelli Symonds [QS]. (2019, June 19). *QS world university rankings methodology.* https://www.topuniversities.com/qs-world-university-rankings/methodology

Rafi, M. A. (2018). Influential factors in the college decision-making process for Chinese students studying in the U.S. *Journal of International Students, 8*(4), 1681-1693. https://www.doi.org/10.5281/zenodo.1468068

Redden, E. (2019, November 26). *Is OPT in peril?* Inside Higher Ed. https://www.insidehighered.com/news/2019/11/26/lawsuit-challenges-program-allows-int

ernational-students-work-us-after-graduating

Redden, E. (2021, February 2). *Legal win for foreign student work program.* Inside Higher Ed. https://www.insidehighered.com/news/2021/02/02/federal-judge-upholds-legality-foreign-student-work-program-case-not-over

Reiter, A. G. (2020). *U.S. News & World Report historical liberal arts college and university rankings*. http://andyreiter.com/datasets/

Ruiz, N. (2014). *The geography of foreign students in U.S. higher education: Origins and destinations*. The Brookings Institution Press. http://www.brookings.edu/research/interactives/2014/geography-of-foreign-students

Ruiz, N. G., and Budiman, A. (2018, May 10). *Number of foreign college students staying and working in U.S. after graduation surges*. Pew Research Center. http://assets.pewresearch.org/wp-content/uploads/sites/2/2018/05/10110621/Pew-Research-Center_Foreign-Student-Graduate-Workers-on-OPT_2018.05.10.pdf

Sa, C. M., & Sabzalieva, E. (2018). The politics of the great brain race: Public policy and international student recruitment in Australia, Canada, England, and the USA. *Higher Education, 75(*2), 251-253. https://doi.org/10.1007/s10734-017-0133-1

ShanghaiRanking Consultancy. (2019) *Academic ranking of world university 2019 methodology.* http://www.shanghairanking.com/ARWU-Methodology-2019.html

She, Q., & Wotherspoon, T. (2013). International student mobility and highly skilled migration: A comparative study of Canada, the United States, and the United Kingdom. *SpringerPlus, 2*(132), 1-14. https://www.doi.org/10.1186/2193-1801-2-132

Shen, Y. (2016). *The impacts of the influx of new foreign undergraduate students on U.S. higher education*. University of Notre Dame Working Paper.

https://economics.nd.edu/assets/212112/ying_foreign_students.pdf

Shih, K. (2016). Labor market openness, H-1B visa policy, and the scale of international student enrollment in the United States. *Economic Inquiry, 54*(1), 121-138. https://doi.org/10.1111/ecin.12250

Smith, E. (2008). *Using secondary data in educational and social research.* McGraw Hill/Open University Press.

Souto-Otero, M., & Enders, J. (2017). International students' and employers' use of rankings: A cross-national analysis. *Studies in Higher Education, 42*(4), 783-810. https://www.doi.org/10.1080/03075079.2015.1074672

Spencer-Rodgers, J. (2000). The vocational situation and country of orientation of international students. *Journal of Multicultural Counseling and Development, 28*(1), 32–50. https://doi.org/10.1002/j.2161-1912.2000.tb00226.x

The Carnegie Classifications of Institutions of Higher Education. (n.d.) *Basic classification description.* https://carnegieclassifications.iu.edu/classification_descriptions/basic.php

The World Bank. (n.d.). *GDP (current US$) – Puerto Rico*. https://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=PR

Times Higher Education. (2019, September 2). *THE world university rankings 2020: Methodology*. https://www.timeshighereducation.com/world-university-rankings /world-university-rankings-2020-methodology

Titus, M. (2009). The production of bachelor's degrees and financial aspects of state higher education policy: A dynamic analysis. *Journal of Higher Education, 8*(4), 439-468. https://doi.org/10.1353/jhe.0.0055

Todoran, C., & Peterson, C. (2020). Should they stay or should they go? How the 2017 U.S. travel ban affects international doctoral students. *Journal of Studies in International Education, 24*(4), 440-455. https://doi.org/10.1177/1028315319861344

Tomlinson, M. (2017). Forms of graduate capital and their relationship to graduate employability. *Education and Training, 59*(4), 338-352. https://doi.org/10.1108/ET-05-2016-0090.org

UNESCO Institute of Statistics. (2020). *Global flow of tertiary-level students.* http://uis.unesco.org/en/uis-student-flow

United Nations, Department of Economic and Social Affairs, Population Division. (2018). *The world's cities in 2018—Data booklet* (ST/ESA/ SER.A/417). https://www.un.org /en/events/citiesday/assets/pdf/the_worlds_cities_in_2018_data_booklet.pdf

Urban, E., & Palmer, L. B. (2016). International students' perceptions of the value of U.S. higher education. *Journal of International Students, 6*(1), 153-174. https://www.ojed.org/index.php/jis/article/view/486

Urias, D., & Yeakey, C. C. (2009). Analysis of the U.S. student visa system: Misperceptions, barriers, and consequences. *Journal of the Studies in International Education, 13*(1), 72-109. https://doi.org/10.1177/1028315307308135

U.S. News and World Report [USNWR]. (2004, January 1). America's best colleges 2005. *U.S. News and World Report*.

USNWR. (2005, January 1). America's best colleges 2006. *U.S. News and World Report*.

USNWR. (2006, January 1). America's best colleges 2007. *U.S. News and World Report*.

USNWR. (2007, January 1). America's best colleges 2008. *U.S. News and World Report*.

USNWR. (2008, January 1). Solving the college crisis: America's best colleges. *U.S. News and*

World Report.

USNWR. (2009, January 1). America's best colleges 2010. *U.S. News and World Report*.

USNWR. (2010, February 1). Best colleges 2011. *U.S. News and World Report*.

USNWR. (2011, February 1). Best colleges 2012. *U.S. News and World Report*.

USNWR. (2012, September 10). Best colleges 2013. *U.S. News and World Report*.

USNWR. (2013, September 9). Best colleges 2014. *U.S. News and World Report*.

USNWR. (2014, September 9). Best colleges 2015. *U.S. News and World Report*.

USNWR. (2015, January 1). Best colleges 2016: Find the best colleges for you! *U.S. News and World Report*.

USNWR. (2016, October 25). Best colleges 2017: Find the best colleges for you! *U.S. News and World Report*.

USNWR. (2017, October 24). Best colleges 2018: Find the best colleges for you! *U.S. News and World Report*.

USNWR. (2018, October 30). Best colleges 2019: Find the best colleges for you! *U.S. News and World Report*.

USNWR. (2019, Oct. 29). Best colleges 2020: Find the right colleges for you! *U.S. News and World Report*.

USNWR. (2020). *Search U.S. news best colleges.* https://premium.usnews.com/best-colleges/search?_sort=rank&_sortDirection=asc

US Citizenship and Immigration Services [USCIS]. (2017, December). *SEVIS by the numbers: General summary quarterly overview (November 2017).* https://www.ice.gov/doclib/sevis/pdf/byTheNumbersDec2016.pdf

USCIS. (n.d.-a). *Student and exchange visitors.* US Department of Homeland Security.

Retrieved August 25th from https://www.uscis.gov/working-in-the-united-states/students-and-exchange-visitors

USCIS. (n.d.-b). *Optional practical training (OPT) for F-1 students*. US Department of Homeland Security. Retrieved June 3rd from https://www.uscis.gov/opt

U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary System (IPEDS). (2004-2019). *IPEDS complete data files*. [Data files and dictionaries]. https://nces.ed.gov/IPEDS/datacenter/DataFiles.aspx?goToReportId=7

U.S. Immigration and Customs Enforcement (ICE). (2020). *Students utilizing Optional Practical Training in 2019 and Demographic factors*. (2020-ICFO-26894). [FOIA Data file].

U.S. ICE. (n.d.). *SEVP Data Library*. https://www.ice.gov/SEVPdata

U.S. ICE. (2016, May 10). *STEM designated degree program*. https://www.ice.gov/sites/default/files/documents/Document/2016/stem-list.pdf

Van Alebeek, W., & Wilson, K. B. (2019). Explaining the college choice decisions of international students at a regional university in the United States. *Journal of Research in International Education, 18*(3), 292-309. https://doi.org/10.1177/1475240919892468

Van De Walker, D., & Slate, J. R. (2019). The 2017 Trump Administration travel ban and international graduate applications at two Texas public universities. *Higher Education Politics & Economics, 5*(1), 1-14. https://doi.org/10.32674/hepe.v5i1.1173

Volkwein, J. F., & Sweitzer, K. V. (2006). Institutional prestige and reputation among research universities and liberal arts colleges. *Research in Higher Education, 47*(2), 129-148. https://doi.org/10.1007/s11162-005-8883-5

Wadman, M., & Stone, R. (2017, 10 February). Grad students, postdocs with U.S. visas face uncertainty. *Science, 355*(6325), 557-558. https://doi.org/10.1126/science.355.6325.557

Wallerstein, I. (2004). *World-systems analysis: An introduction*. Duke University Press.

Walsh, P. W. (2020, March 21). *International student migration to the UK*. The Migration Observatory. https://migrationobservatory.ox.ac.uk/resources/briefings/international-student-migration-to-the-uk/

Wei, H. (2013). An empirical study on the determinants of international student mobility: A global perspective. *Higher Education, 66,* 105-122. https://doi.org/10.1007/s10734-012-9593-5

Wilkins, S., Balakrishnan, M. S., & Huisman, J. (2012). Student choice in higher education: Motivations for choosing to study at an international branch campus. *Journal of Studies in International Education, 16*(5) 413 –433. https://doi.org/10.1177/1028315311429002

Wong, A. (2019, September 6). Colleges face growing international student-visa issue*s. The Atlantic.* https://www.theatlantic.com/education/archive/2019/09/how-harvard-and-other-colleges-grapple-student-visa-problems/597409/

Wooldridge, J. M. (2000). *Introductory econometrics: A modern approach.* South-Western College Publishing.

Yeakey, C. C., & Yin, M. (2019). The policy implications of the global flow of tertiary students: A social network analysis. *Oxford Review of Education, 45*(1), 50–69. https://doi.org/10.1080/03054985.2018.1489788

Yao, Y., & Tong, Y. (2018). International students of higher education in the United States: A GIS study of their origination and location. *Educational Planning, 25*(3), 31-45.

Zhang, L. (2007). Nonresident enrollment demand in public higher education: An analysis at national, state, and institutional levels. *Review of Higher Education, 31*(1), 1-25. http://www.doi.org/10.1353/rhe.2007.0057

APPENDIX A

Data Analysis Additional Details

Table A1

Sensitivity Check for Research Question One using ISE Percentage

Predictors	*b*	Robust SE	*z*	*p*
International Student Enrollment Percentage				
L1.	0.55	0.02	34.03	0.000***
L2.	0.13	0.01	11.15	0.000***
L3.	0.06	0.01	4.96	0.000***
L4.	0.03	0.01	2.88	0.004**
State Unemployment Rate				
-.	-0.06	0.02	-3.41	0.001***
L1.	0.06	0.02	2.67	0.008**
L2.	-0.03	0.02	-1.34	0.181
L3.	0.00	0.02	-0.04	0.968
L4.	0.03	0.01	2.34	0.019*
State Gross Domestic Product				
-.	0.0000004	0.0000005	0.72	0.472
L1.	0.0000000	0.0000008	-0.03	0.974
L2.	-0.0000008	0.0000008	-1.08	0.28
L3.	0.000001	0.0000005	2.56	0.011**
L4. [a]	-0.0000007	0.0000004	-1.78	0.075
Tuition				
-.	0.00001	0.000009	1.61	0.108
L1.	0.00001	0.00001	1.16	0.246
L2.	-0.00002	0.00001	-1.84	0.066
L3.	0.0000003	0.000006	0.04	0.967
L4.	-0.00001	0.000008	-1.42	0.157
Ranking				
-.	0.00	0.02	0.08	0.937
L1.	-0.06	0.02	-2.65	0.008**

Table A1 (continued)

L2.	0.03	0.02	1.24	0.217
L3.	-0.01	0.02	-0.28	0.777
L4.	-0.03	0.02	-1.3	0.194
Total Student Population [b]	-0.00001	0.000005	-2.34	0.019*
Graduate Students	0.004	0.004	1.15	0.249
STEM Students	-0.0002	0.00007	-2.83	0.005**
Carnegie Category 4	-0.72	0.55	-1.31	0.19
Carnegie Category 3	0.08	0.35	0.22	0.827
Carnegie Category 2	0.06	0.08	0.81	0.419

n = 31,724

[a] Lag four of GDP was significant in the raw ISE model. [b] The Total Student Population Variable is a positive predictor in the raw ISE model.

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

VITA
NATALIE IRBY CRUZ

EDUCATION

Old Dominion University (Norfolk, Virginia)
Ph.D. Higher Education
Dissertation: *Context Matters: A Longitudinal Analysis of Academic and Economic Factors that Influence International Student Enrollment in The United States*
Chair: Christopher R. Glass

University of South Carolina (Columbia, SC)
M.Ed., Higher Education and Student Affairs

Clemson University (Clemson, SC)
B.A., Psychology

SELECT PROFESSIONAL EXPERIENCE

Graduate Research and Teaching Assistant 2018 - present
Old Dominion University

Instructor and Academic Advisor, University College 2016 - 2018
Zayed University (Abu Dhabi, UAE)

Director of Office of International Student Life 2013 - 2016
Emory University (Atlanta, GA)

SELECT PUBLICATIONS

Cruz, N., Sy, J., Shukla, C., & Tysor, A. (in press). Ready, willing, and able? Exploring the r relationships and experiences of international students at a national university in the United Arab Emirates. In A. Hayes & S. Findlow (Eds.), *Constructions of (inter-)national students in the Middle East: Comparative critical perspectives*. Routledge.

Hou, M., Cruz, N., Glass, C. R., & Lee, S. (2021). Transnational postgraduates: Navigating academic trajectories in the globalized university. *International Studies of Sociology in Education.* https://doi.org/10.1080/09620214.2020.1853590

Gesing, P., Cruz, N., and Lynch, R.J. (2021). Global policy impacts on career outcomes: An international student mobility case study. In Glass, C. R. & Gesing, P. (Eds.), *Critical perspectives on equity and social mobility in study abroad: Interrogating issues of unequal access and outcomes*. Routledge.

Cruz, N., Raby, R. L., Glass, C. R., & Fischer, H. (2020). Catalysts of change: Entrepreneurial problem-solving for unscripted futures. *Association of International Education Administrators.* https://aiea.memberclicks.net/assets/docs/OccasionalPapers