

The Price of Being International: Exploring Early Career Outcome Differences
between International and Domestic Master's Recipients from U.S. Institutions

By

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Abstract

Based on neo-racism theory, this study seeks to examine whether international master's recipients (IMR) who graduated from U.S. institutions have significant early career outcome differences as compared to domestic master's recipients (DMR) in terms of major-job match, annual earnings and job satisfaction. By analyzing combined datasets of National Survey of Recent College Graduates (2001, 2003, 2006, 2008, 2010), this study attempts to examine employment outcome differences between international and domestic master's recipients from three perspectives. First, this study tries to answer whether international status has a significant effect on international master's recipients' career outcomes relative to domestic master's recipients. In addition, this study examines the extent to which the effect of international status on career outcomes differs by field of study, Carnegie classification and institutional control. Further, the present study investigates whether country of origin plays a significant role in shaping international master's recipients' early career outcomes by comparing career outcomes of international master's recipients born in China and India to domestic master's recipients born in the U.S.

After controlling for demographic, educational and job market characteristics, this study found that international master's recipients were two times more likely than domestic master's recipients to hold jobs that are related to their master's degree, faced a 6% earnings disadvantage as compared to domestic master's recipients, and did not have significant difference in job satisfaction as compared to domestic master's recipients. The subgroup analysis found that international status effect on employment outcomes differs by field of study, Carnegie classification and institutional control. In particular, all else being equal, international master's recipients with engineering majors faced a 12.24% annual salary loss as compared to their domestic engineering peers in the U.S. job market. International master's recipients who

graduated from Research II institutions in Carnegie classifications had a significant 14.15% earnings loss as compared to their domestic master's recipients from the same institutions, all else being equal. In terms of country of origin effect on career outcomes, this study found that international master's recipients from India performed much better in the U.S. job market than international master's recipients from China in annual earnings and job satisfaction.

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Chapter 1: Introduction

Anuradha, a twenty-nine-year-old computer programmer who holds an MBA degree from a U.S. college described her working situation in the U.S. IT industry:

Although personally, I've had no problems, there are restrictions on H-1B holders. We have to work more. Everyone leaves around 3:30 or 4:00, working 7 to 8-hour days, but H-1Bs stay for 10 to 11 hours. The pay is less. I'd say it is 15 to 20 percent less. We do not get paid overtime. Natives do not care how much work they do. Professional respect is less than it is for a U.S. native of the same caliber (Chakravartty, 2006).

This narrative from an Asian Indian worker in the U.S. information technology (IT) industry suggests possible discrimination toward foreigners as well as the existence of a hierarchy in the U.S. labor market with domestic workers ranking higher in the hierarchy than foreigners. Although Chakravartty's study (2006) focused mostly on Asian Indian workers without U.S. education, it emphasized significantly different career outcomes between foreign and domestic workers, even with similar professional qualifications. Further, previous studies suggested that international students and international postdoctoral researchers in the U.S. institutions tend to be discriminated against due to their foreign culture (Cantwell & Lee, 2010; Lee & Opio, 2007; Lee & Rice, 2007). Inspired by prior literature, this dissertation seeks to examine whether international master's recipients (IMR) have significant early career outcome differences as compared to domestic master's recipients (DMR) in terms of major-job match, annual earnings and job satisfaction. By analyzing combined datasets of National Survey of Recent College Graduates (2001, 2003, 2006, 2008, 2010), this study attempts to examine three employment outcome differences between international and domestic master's recipients who received their master's degree from the U.S. institutions from three perspectives. First, this study tries to answer whether international status has a significant effect on international master's

recipients' career outcomes relative to domestic master's recipients. In addition, this study examines the extent to which the effect of international status on career outcomes differs by field of study and college quality as measured by Carnegie classification and institutional control. Further, the present study investigates whether country of origin plays a significant role in shaping international master's recipients' early career outcomes.

In this chapter, I first present the background of this research, outline the purpose of the research, and define international and domestic master's recipients. After introducing the theoretical frameworks of this study, I present the hypotheses of this research, the importance of this study, and potential policy implications in detail.

Background

With the influx of international students enrolling in U.S. postsecondary institutions for the past decades, there has been a rapid growth of international students at the master's level. For instance, 208,355 international students studied at the master's level in 2014/15, representing a dramatic increase of 71.45% as compared to international master's students (a total of 121,523) in 2004/05 (Institute of International Education, 2015). By comparison, from 2004/05 to 2014/15, the total number of international students at the doctoral level has only increased by 15.69% (118,104 in 2014/15 vs. 102,084 in 2004/05). Accordingly, an increasing number of international students at the master's level have acquired their U.S. credentials and entered the job market in the U.S. For example, international master's recipients acquired 12% of the 757,387 master's degrees awarded in the U.S. in 2012. This figure is even higher in engineering fields, where 41% of master's degrees were conferred on international students. These figures are significantly higher than the overall ratio of international students, which was just four percent of the total U.S. higher education student body (World Education News & Reviews,

2015). The proportion of international students with master's degrees who stayed and worked in the U.S. has increased as well. One study found that of all temporary foreign workers employed in the U.S. (H-1B visa holders), the proportion of international students, mostly with master's and doctoral degrees, has increased from 43% (57,190) in 2000 to 62% (79,980) in 2009, surpassing the portion of the foreign-educated temporary workers, who represented 38% of total foreign temporary workers (Government Accountability Office, 2011).

For these reasons, international students at the master's level and international master's recipients working in the U.S. are of particular importance for U.S. postsecondary institutions and for the development of the U.S. economy. In addition to bringing diversity and new perspectives to U.S. campuses (Bevis, 2002; Harrison, 2002), international graduate students make large contribution to postsecondary institutions and local economies in the form of both tuition dollars and new jobs that are created or supported by international students' spending, which occurs in higher education, health insurance and other related sectors. In fact, according to a report from the Association of International Educators, international students across the country contributed \$26.8 billion to U.S. institutions and local economies, while supporting 340,000 jobs in the 2013-2014 academic year (The Association of International Educators, 2014).

Additionally, international students working in the U.S. have become important contributors to the development of the U.S. economy (Stephan & Levin, 2003; Wadhwa, Saxenian, Freeman, & Salkever, 2009). In general, international students increase the host country's pool of highly skilled workers, providing a young workforce for developed countries that are typically characterized by declining birth rates and aging populations. International students are more attractive to host country employers than foreign-educated workers because of

their local educational experience (Arthur & Flynn, 2011). Despite the growing importance of international master's students for the postsecondary institutions and U.S. economy, there has been little research on studying their transition from degree-seekers to highly skilled workers in the U.S., especially their employment outcomes in the U.S. job market.

A comprehensive study of international master's recipients' career outcomes can provide useful information for postsecondary institutions in terms of recruiting high quality international students. The career outcomes of current international master's recipients in the U.S. may shape future international graduate students' decisions as whether to study abroad and if U.S. is the destination. Researchers studying international students have anticipated that an increasing number of future international students will place more emphasis on working in their host country with the purpose of acquiring foreign work experience even if they choose to move back to their home country (Gribble & Blackmore, 2012). The rapid growth in international education in major source countries, such as China, has led to a large number of graduates with foreign degrees crowding the labor market. In this situation, holding western degrees alone is not enough for international students to stand out in a highly competitive home country market. In this environment, foreign work experience in their home countries becomes more important than ever in providing international students an edge locating desirable employment (Gribble, 2014; Gribble & Blackmore, 2012). The growing emphasis on work experience among international students highlights the importance of paying more attention to the career outcomes of international students for postsecondary institutions and host countries. Regardless of where they work, the prospects of career success for international students might have significant influence on recruiting future international students (Gribble, 2014).

Studying career outcomes of international master's recipients can also provide useful insights for the U.S. to better attract and retain foreign talent, which is critical for the U.S. maintaining its leading position in the global knowledge economy. Theories of college enrollment suggest that the decision to enroll tends to be based on a comparison between the present value of perceived lifetime benefits and the present value of perceived life costs (Fuller, Manski, & Wise, 1982; Manski & Wise, 1983; Schwartz, 1985). According to these theories, international master's recipients' decision to study in the U.S. could be negatively influenced if their perceived benefits do not match the costs of studying abroad in the U.S. Furthermore, a recent study has found that international master's students considered their career prospects as the most important attribute an institution can provide (World Education Services, 2015). Thus, career outcomes of international master's recipients could significantly influence future international graduate students' intention to study in the U.S. and to stay and work in fields for which there is a high demand for their skills. Studying international master's recipients' career outcomes is becoming more important in the context of global competition for foreign talent. During past decades, the U.S. has been considered as the "IQ magnet" for highly skilled foreign workers (Shachar, 2006, p.148), but this trend has recently changed. The U.S. is no longer the sole country actively recruiting the best foreign talent. Instead, other developed countries, such as Canada, Australia, and the United Kingdom, have strongly competed for the highly skilled foreign talent (Shachar, 2006).

In understanding the career outcomes of international master's recipients, one important aspect is to examine whether they have career outcomes that are comparable to domestic master's recipients since they receive the same master's degree from U.S. institutions. Prior research has indicated that many highly skilled students seek further educational opportunities

outside of the U.S. due to the perception of an unwelcoming climate for international students in the U.S. (Association of American International Educators, 2004a; Lee & Rice, 2007). This unwelcoming climate is likely to be attributed to discrimination against the foreign culture of international students (Lee & Opio, 2007; Lee & Rice, 2007). Further evidence suggests that international workers in the U.S. tend to face struggles in gaining career outcomes comparable to domestic workers (Chakravartty, 2006; Cantwell & Lee, 2010). These previous studies suggest the possible continuing discrimination towards international master's recipients from the college campus to the U.S. job market. The present study, therefore, can contribute to the prior literature on career outcomes of college graduates by systematically studying international master's recipients' three monetary and non-monetary career outcomes—salary, major-job match, and job satisfaction, with an emphasis on career outcome gaps between international and domestic master's recipients.

Definitions

Among master's recipients who received master's degree from the U.S. and worked in the U.S., international master's recipients (IMR) in this study were restricted to those who were non-U.S. citizens and held temporary resident visas, while domestic master's recipients (DMR) refer to those who are domestic U.S. citizens. Studying career outcomes of international master's recipients requires a clear restriction of the working visa status because visa types are closely associated with immigrants' career outcomes (Fogg & Harrington, 2012; Lan, 2013). For international master's recipients, the working visa status in the U.S. represents more than just immigration categories, but carries a variety of characteristics related to educational backgrounds and immigration regulations that could significant shape career outcomes of immigrants in the U.S. job market (Fogg & Harrington, 2012; Lan, 2013). For instance, Lan (2013) found that

international workers in U.S. job market tended to have improved career outcomes after they acquired their permanent resident status, possibly because their freedom to change jobs was largely limited when they were on temporary working visas.

Purpose of the Study

This study aims to explore early career outcome of international master's recipients and whether international master's recipients have different patterns in the career outcomes as compared to domestic master's recipients.

The first goal of this study is to explore whether international status has played a unique role in shaping the career outcomes of international master's recipients in contrast to their domestic peers. In other words, the first goal of this study is to investigate whether international master's recipients are significantly different in achieving their early career success as compared to domestic master's recipients after controlling for relevant productivity-related factors. In the U.S., American culture and ideals are largely shaped by the predominately Anglo-American heritage (Hirschman & Snipp, 2001). Among domestic populations, Whites still enjoy socioeconomic advantages in the labor market, such as favored job interviews, improved career opportunities, and higher labor market rewards compared to racial minorities (Saenz & Morales, 2005). Likewise, prior research indicates that due to their cultural and linguistic barriers, international students tend to be perceived as less productive in the labor market than domestic students by host country employers (Arkoudis, Hawthorne, & Baik, 2009; Robertson, Hoare, & Harwood, 2011). Although what factors lead to international students' lower career outcomes are still unclear, research suggests that the market value of a U.S. education is likely to be "reconfigured" in a context in which international students compete with domestic students with the same qualifications (Robertson et al., 2011, p.7). In other words, Robertson et al. (2011)

suggest that international students may be less likely to convert their western education into career success than their domestic peers, even with the same degrees. Moreover, higher education research has found that international students are more likely to be discriminated against on campus due to their foreign culture and nationality instead of race (Lee & Opio, 2007; Lee & Rice, 2007). Despite the lack of empirical evidence on international students' career outcomes in the U.S., some qualitative studies have found evidence that foreign workers also have unequal working conditions, lower pay, and longer work hours compared to domestic workers, possibly due to discrimination toward foreigners (Cantwell & Lee, 2010; Chakravartty, 2006). Therefore, building on the previous literature on international students (Arkoudis et al., 2009; Cantwell & Lee, 2010; Chakravartty, 2006; Lee & Opio, 2007; Lee & Rice, 2007), this study expands the research focus of international students from the context of college campus to the U.S. labor market by emphasizing the early career differences between international and domestic master's recipients.

The next step of the analysis aims at investigating the extent to which the effect of international status on career outcomes differs by field of study and college quality. Prior research consistently has found evidence that the stratification in college quality and field of study results in different economic returns to higher education investments (Rumberger & Thomas, 1993; Thomas, 2000, 2003; Thomas & Zhang, 2005). Recent research on career outcomes of college graduates has emphasized the heterogeneity in the magnitude of the returns to institutional quality and fields of study due to effect of family background on career advancements. By examining the hiring process of elite firms, Rivera (2015) found that even among graduates from elite institutions, applicants from privileged backgrounds were more likely to be employed by top law and business firms. Supporting this view, Borgen (2015) found

empirical evidence that students from privileged backgrounds can use family connections to convert their educational credentials into high pay. If international status negatively affects the career outcomes of international master's recipients due to their foreign culture and nationality as suggested by the qualitative studies (Cantwell & Lee, 2010; Chakravartty, 2006), then it is reasonable to expect that international and domestic master's recipients have significantly different career outcomes even with similar measures of major and college quality. Thus, this study can contribute to the prior literature on college attendance and career success by exploring whether international master's recipients are less likely to reap the monetary and non-monetary benefits of attending the same U.S. institutions and majoring the same field of study.

Because international students differ largely in their cultural and economic conditions, this study further explores the effect of country of origin on labor market success of international master's recipients. Studying discrimination toward international undergraduate and graduate students on college campuses, Lee and Rice (2007) found evidence that international students' experience of discrimination varied by their countries of origin, depending on how different their foreign culture is from the U.S. dominant culture. In particular, students from Asia, India, Latin America, and the Middle East reported considerable indirect or direct discrimination, whereas students from countries like Europe, Canada, and New Zealand did not report any direct negative experiences related to their race or culture. Supporting this view, prior literature on employment outcomes of immigrants uncovered that while immigrants are visible targets for racial, cultural, or ethnic discrimination in the host country, immigrants from non-European backgrounds hold lower economic achievement than immigrants of European origin (Bratsberg & Ragan, 2002; Hou & Balakrishnan, 1996; Phythian, Walters, & Anisef, 2011; Reitz & Breton, 1994). Thus, prior literature indicates that country of origin may not only have effects on international

students' learning experiences on campus but may also significantly influence their career outcomes in the labor market, highlighting the necessity of studying the effect of country of origin on career outcomes of international master's recipients. Therefore, this study aims to investigate whether international master's recipients from countries that are culturally similar to the U.S. enjoy better career outcomes than those from countries that are culturally distinct from the U.S., relative to domestic master's recipients born in the U.S.

Research Questions and Methodology

The following research questions guide this study:

1. What are the descriptive characteristics of demographic, educational and job market factors for international and domestic master's recipients?
2. Does international status play a unique role in determining their job market outcomes (major-job match, salary, and job satisfaction) after controlling for relevant demographic, educational and job market characteristics?
3. Other things being equal, does the effect of international status on career outcomes differ by major, Carnegie classification and institutional control?
4. After controlling for demographic, educational and job market characteristics, do countries of origin (International master's recipients from China and India as compared to domestic master's recipients from the U.S.) have a significant impact on international master's recipients' career outcomes as compared to domestic master's recipients?

To answer these questions, this study examined combined datasets of the National Survey of Recent College Graduates (survey 2001, 2003, 2006, 2008, and 2010). This combined dataset fits this research well in that it carries rich data on visa types, demographics, educational

backgrounds and job market characteristics that are largely associated with career outcomes. As for the sample size, the total number of international master's recipients who were full-time and holding temporary resident visas was 1,664 and the corresponding figure for domestic master's recipients was 9,940. This study first conducted Ordinary Least Squares OLS models and ordered logistic regression models to study the net effect of international status on major-job match, annual earnings and job satisfaction. Then, given the clustering structure of data in this study—1,664 and 9,940 international and domestic master's recipients nesting within 352 institutions, I tested both one level regression and multilevel modeling because of the concerns regarding the clustered structure of the data. Since the findings are quite similar, I decided to go with one level regression because of the easy interpretations for findings.

Theoretical Framework and Hypotheses

This research primarily employs human capital theory and neo-racism theory as theoretical lenses to understand different early labor market outcomes between international and domestic master's recipients. Human capital theory and neo-racism theory can help illuminate why international master's recipients may have significant differences in career outcomes compared to their domestic peers. Human capital theory suggests that individuals become productive by investing in education and training, thus improving their job outcomes, including earnings, power, and occupational status (Becker, 1993; Paulsen, 2001; Rosenbaum, 1986). Human capital theory relies on the premise that the labor market is meritocratic, hence individuals with equal credentials will have the opportunity for equal outcomes in the job market. However, in reality, the labor market is never completely meritocratic. Instead, workers must negotiate with potential employers to decide the market value of their educational investments (Anisef, Sweet, & Frempong, 2003).

Neo-racism theory posits that there has been a new racism toward foreigners based on culture and nationalities instead of race (Balibar, 1992; Barker, 1981; Hervik, 2004; Spears, 1999). Neo-racism, also called new racism, is a version of discrimination toward foreigners based on culture and nationalities rather than race (Balibar, 1992; Barker, 1981; Hervik, 2004; Spears, 1999). Drawing on the neo-racism theory, Lee and Opio (2007) and Lee and Rice (2007) found that international students were likely to be discriminated against both on and off campus because of their foreign culture. They also confirmed that international postdoc researchers are subject to neo-racism discrimination in their career advancement. This discrimination may carry over into the labor market as well. Indeed, in studying the work experiences of Indian workers in U.S. IT industries, Chakravarty (2006) found that Indian H-1Bs, including international student workers holding U.S. degrees, experienced overt and subtle discrimination in and outside the workplace and had both lower pay and longer working hours. In addition to the racial discrimination, Chakravarty (2006) suggested the possible existence of neo-racism and interpreted it as “a renewed xenophobia and nativist sentiments” (p. 38). International master’s recipients differ greatly from domestic master’s recipients in that international master’s recipients are likely to be disadvantaged in cultural awareness, language communication and local network support (Arkoudis et al., 2009; Robertson et al., 2011).

Neo-racism theory argues that cultural and nationality differences may be additional causes of discrimination against foreigners (Balibar, 1992; Barker, 1981; Hervik, 2004; Spears, 1999). Following the assumption of neo-racism, it is assumed that international master’s recipients may be less likely to achieve career success comparable to their domestic peers, even when graduating from the similarly selective institutions and with the similar professional expertise. Although the effect of college quality on wages are generally consistent, researchers

have argued that the returns on college quality are not universal but rather differ by sub-populations (Borgen, 2014; Karabel & McClelland, 1987; Monks, 2000). For instance, research found that students from privileged backgrounds appear to be more likely to convert their educational credentials into high pay than students from disadvantaged homes because those from privileged families can employ more resources to obtain high paying jobs (Borgen, 2014; Karabel & McClelland, 1987). Likewise, as stated by Chakravartty (2006), foreign workers who suffered from neo-racism were perceived as “second-rate citizen(s)” compared to domestics (p. 38). Thus, in the case of international master’s recipients, they may be less likely than their domestic peers to reap the economic benefits of attending high-quality institutions and holding professional degrees, such as STEM and business professional majors. Similarly, due to the disadvantage of being foreigners in U.S. job market, international master’s recipients may be less likely to find jobs related to their major and may be less satisfied with their jobs as compared to domestic master’s recipients.

Moreover, the U.S. immigration regulations may further facilitate the proliferation of unequal treatment toward international master’s recipients. Due to the H-1B (working visa for foreign temporary workers) regulations, international students only can legally work in the U.S. through employer-sponsored working visas. Because switching employers brings the high risk of losing a working visa, most foreign temporary workers, whether voluntarily or involuntarily, remain with the specific employer until they can obtain permanent residence status, which usually takes five to six years (Matloff, 2003). The restricted mobility of H-1B workers makes foreign temporary workers vulnerable to exploitation in the form of lower pay and longer working hours (Matloff, 2003) and constrains their negotiating power to gain better career outcomes (Lowell, 1999). Previous studies have suggested that due to the fear of losing the

employer-sponsored working visa, foreign workers may be likely to endure unfair treatment for the sake of permanent residence (Lowell, 1999; Matloff, 2003). Thus, given the importance of types of working visa in influencing international master's recipients' career outcomes, this study sample was restricted to international master's recipients with temporary H-1B visas.

Furthermore, neo-racism suggests the extent to which international master's recipients suffer from this new discrimination in the labor market may be not universal but rather differ by country of origin. Neo-racism suggests the importance of studying career success of international students by their country of origin because countries differ greatly in terms of cultural similarities to the U.S. dominant culture (Balibar, 1992; Barker, 1981; Hervik, 2004; Spears, 1999). Supporting this view, previous literature revealed that immigrants are visible targets for racial, cultural, or ethnic discrimination in the host country, but immigrants from non-European backgrounds hold lower economic achievement than immigrants of European origin because of their visible racial minority status and foreign culture (Bratsberg & Ragan, 2002; Hou & Balakrishnan, 1996; Phythian, Walters, & Anisef, 2011; Reitz & Breton, 1994). Thus, based on the neo-racism theory, this study hypothesizes that international master's recipients from countries that are culturally similar to the U.S. enjoy better career outcomes than those from countries that are culturally distinct from the U.S. compared to domestic students.

Based on the prior literature and theories, this research makes the following hypotheses:

1. All else being equal, international master's recipients have a more disadvantaged career outcome than domestic master's recipients.
2. International master's recipients are less likely to have favorable career outcomes than domestic master's recipients, even with degrees from similarly selective colleges and majoring in the same field.

3. Career outcomes of international master's recipients differ significantly by country of origin as compared to domestic master's recipients born in the U.S. International master's recipients from countries (e.g., Canada, Australia, and European countries) that are culturally similar to the U.S. may enjoy better career outcomes than others from culturally different countries (e.g., Asian and African countries).

Importance of the Study and Policy Implications

The present research can have important policy implications for postsecondary institutions and the U.S. regarding educating and retaining the most talented international students. This research can improve knowledge for postsecondary institutions to aid in recruiting and attracting the best foreign talent. From the perspective of international students and their families, how international students perform in the labor market after studying in the U.S. could have important influences on choices of future international graduate students about whether and where to study abroad. Studying abroad is a costly investment for international students and their families since they usually pay much higher tuition than domestic students, with 56% of graduate students and most undergraduate students paying for their education through family and non-U.S. resources (IIE, 2005).

The increasing number of international students at the master's level in the U.S. suggests that international students and their families believe that U.S. postsecondary education can provide them with the unique skills and marketable degrees that can lead to advantages for future employment (Brooks, Waters, & Pimlott-Wilson, 2012). However, studies focusing on international students have cautioned that as the large number of graduates with foreign degrees crowd the labor market in home countries, such as China, holding western degrees alone is not enough for international students to stand out in this highly competitive market in their home

countries. Having foreign work experience has now become more important than before for international students to secure desirable employment (Gribble, 2014; Gribble & Blackmore, 2012). With future international master's students arguably putting more attention on the prospects of employment in their host country when deciding where to study abroad (Gribble, 2014), postsecondary institutions and policy makers may need to pay more attention to understanding international students' career outcomes and take actions to prepare international students for the future career success. Therefore, studying career outcomes of master's recipients in the U.S. labor market can have important policy implications for postsecondary institutions' policy-making for recruiting future international graduate students.

From a global perspective, given that attracting and retaining the best foreign talent is closely associated with the development of a modern knowledge-based economy (Stephan & Levin, 2003; U.S. Bureau of Labor Statistics, 2014; Wadhwa et al. 2009), an improved understanding of labor market outcomes of international students has important implications for both the postsecondary institutions and the U.S. as a whole. Research has shown that international highly skilled workers have made significant contributions to the U.S. economy (Stephan & Levin, 2003; U.S. Bureau of Labor Statistics, 2014; Wadhwa et al., 2009). Although the U.S. is still the largest host country for international students by far, the U.S. faces intense competition from other western countries in recruiting international graduate students in the rapid expansion of international study (Altbach, 2004). Host countries, such as Australia and Canada, have set national policies related to international study and provided incentives to academic institutions to attract international students. In contrast, the U.S. is, in fact, at a disadvantage for recruiting international graduate students because the U.S. has never had a national approach to international higher education (Altbach, 2004). Furthermore, a recent study

has found empirical evidence that the restrictive immigration policy toward highly skilled workers, such as the H-1B system, disproportionately discourages high-ability international students from pursuing education in the U.S. (Kato & Sparber, 2011).

As argued by Altbach (2004), “while the United States will remain a major player in all of these developments because of the size, importance, and excellence of its academic system, whether or not it will be able to maintain its competitive edge and leadership is another matter” (p. 24). Given the high competition for foreign talent among developed countries in a global knowledge-based economy (OECD, 2008; Shachar, 2006), postsecondary institutions may need to expand their focus beyond the initial and middle stages of international students’ experiences of studying abroad (Lee & Rice, 2007; Yeh, 2000). Further, U.S. institutions might need to expand the definition of institutional effectiveness from attracting and graduating international students to preparing them for improved and rewarding careers (Xu, 2010). In this sense, studying the early career of international master’s recipients in the U.S. labor market in the present study can improve understanding about how international students perform in the U.S. labor market after they transition from educational institutions to the workplace. Given the lack of a positive national approach in supporting international higher education (Altbach, 2004) and the intense competition for the foreign talent in the context of global knowledge-based economy (OECD, 2008; Shachar, 2006), U.S. policy makers may need to rethink immigration policies for international students and to shift their perception of international students from temporary visitors to valuable contributors to U.S. economy. In sum, this study can yield useful insights for policy makers in both postsecondary institutions and in the U.S. at large, allowing for better strategies for recruiting and retaining international talent.

Chapter 2: Conceptual Framework

Research on immigrants' employment outcomes has cautioned that there is no single theory that can fully explain employment outcomes of immigrants (Bratsberg & Ragan, 2002; Chiswick, 1978; Phythian, et al., 2011; Zeng & Xie, 2004), thus this research studies job market outcomes of international master's recipients through multiple lens of human capital and neo-racism theory. Human capital theory and neo-racism theory complement each other in studying early career differences between international and domestic master's recipients. Emphasizing the importance of education and training to future career success (Becker, 1993; Paulsen, 2001; Rosenbaum, 1986), human capital theory suggests that after controlling for individual and job market characteristics relevant to productivity in the job market, international master's recipients are assumed to have similar career outcomes as compared to domestic master's recipients in the U.S. job market. On the other hand, based on the notion that cultural difference may be a cause of discrimination against foreigners that could negatively influence foreigners' career advancement (Balibar, 1992; Barker, 1981; Hervik, 2004; Spears, 1999), neo-racism hints that after controlling for relevant individual and job market factors, international master's recipients may have significantly disadvantaged career outcomes as compared to domestic master's recipients, even with the same master's degree. Therefore, human capital theory and neo-racism theory can explain the career outcome difference between these two groups from two different theoretical perspectives.

Human Capital Theory

The human capital model is the dominant paradigm employed in studies that focus on the relationship between investment in educational training and employment outcomes. Human capital theory suggests that individuals can become productive by investing in education and

training, thus improving their job outcomes, including earnings, power, and occupational status (Becker, 1993; Paulsen, 2001; Rosenbaum, 1986). According to human capital theory, people who are more talented, skilled, and capable have more opportunities in the labor market. Common measures of human capital include a student's academic ability or achievement, academic preparation, and educational attainment (Paulsen & Toutkoushian, 2008; Perna & Titus, 2005).

Human capital theory represents a meritocratic ideal that emphasizes the importance of education and training to the future career success of college graduates (Alon & Tienda, 2007). Thus, from the human capital perspective, there are at least two premises that can be created. First, in general, an investment in higher education has a positive relationship with college graduates' career success. In other words, the basic trend is that the more that college graduates invest in higher education training, the more productive and successful they should be in the labor market. Second, from the human capital perspective, college graduates with similar education and training should be productive on a similar scale and thereby enjoy similar labor market rewards. Drawing on the human capital theory, a large body of research has shown that field of study and college selectivity are closely associated with college graduates' labor market outcomes, mostly measured as earnings (Berger, 1988; Eide, 1994; Grogger & Eide, 1995; Rumberger, 1984; Rumberger & Thomas, 1993; Thomas, 2000, 2003; Thomas & Zhang, 2005; Zhang, 2008).

The first assumption based on human capital theory is that international masters' recipients are hired by U.S. employers mainly because they have the knowledge and skills that are largely needed by the U.S. economy. Previous research has well documented that international students who stayed and worked in the U.S. are important inputs into the

development of knowledge economy both at universities and in industry (Barber & Morgan, 1987; Altbach, 1989; Chellaraj, Maskus & Mattoo, 2008; Slaughter & Rhoades, 2004). Thus, it is essentially the human capital—the academic trainings in the bachelor’s or/and master’s programs—that equip international master’s recipients with knowledge and skills to make them employable in the U.S. job market. Thus, without their academic training in the U.S. and their master’s degree, international master’s recipients would not be able to secure employments in the U.S. In sum, human capital theory explains why international master’s recipients are employed in the U.S. in the first place.

In addition, human capital theory also suggests that all things equal, there should not be a significant career outcome difference between international and domestic master’s recipients. The literature on the economic return on college education has predominantly relied on the human capital framework, which asserts that the labor market rewards investments that individuals make in education and training, and these investments lead to improved salaries and other labor market outcomes, such as occupational status in the labor market (Becker, 1993). Since international master’s recipients receive similar academic training in U.S. institutions and are hired with the same master’s degree, there should not be significant career outcome differences between these two groups, all things equal.

Human capital theory also suggests the international and domestic master’s recipients may not differ significantly in career success, even with the same major and graduating from institutions with similar college quality. First, the choice of field of study has a significant impact on an individual’s human capital, which thereby influences an individual’s career outcomes in the job market. According to human capital theory, Becker (1993) defined two different types of training that can occur: general training and specific training. General training is defined as

training that is useful to many firms and is therefore applicable to a wide range of jobs, while specific training is valuable to one or only a few firms and therefore is not as applicable to all job openings (Becker, 1993). In general, specialized majors tend to create more productivity and lead to higher wages in the job market (Thorson, 2005). Furthermore, according to human capital theory, within the same field of study, international master's recipients, due to their similar training from the U.S. institutions, should not have significantly different career outcomes as compared to domestic master's recipients. Similarly, college quality has been considered as another factor that can significantly influence the quality of human capital. It is generally assumed that college graduates from high-quality institutions can be more productive in the job market than ones from low-quality institutions because high-quality institutions can provide students with better resources for human capital improvement than low-quality colleges (Thomas, 2000; Thomas & Zhang, 2005). Thus, human capital theory assumes that international and domestic master's recipients should have similar career outcomes if they graduate from institutions with the similar college quality.

Human capital theory also assumes that countries of origin do not have significant influences on career outcomes of international master's recipients as compared to domestic master's recipients born in the U.S. In studying the career outcomes of immigrants, country of origin has been found to have a profound effect on immigrants' career outcomes, such as earnings in the host countries (Phythian, Walters & Anisef, 2010). According to human capital theory, immigrants from different origin countries bring different skills and knowledge into host countries, which in turn influence how they perform in the job market of host country (Chiswick, 1978; Phythian, Walters & Anisef, 2010). However, the effect of country of origin on career outcomes of immigrants usually occurs among immigrants without host country academic

training and credentials. In the case of international master's recipients, they received the academic training in U.S. institutions and gained U.S. knowledge and skills that fit the need of U.S. employers. The education and work experience acquired in their origin countries may help international master's recipients learn new knowledge and skills in the U.S., but eventually it is the skills and knowledge gained from studying in the U.S. institutions that are more likely to be considered as valuable by U.S. employers. Given the similar academic training and the same master's degree, international master's recipients are not likely to differ from domestic master's recipients in terms of career success, regardless of countries of origin.

Neo-racism Theory

While human capital theory has been the dominant framework used for understanding relationships between individual investments and employment returns, it has its own flaws that limit its ability to fully explain career outcomes of college graduates. Human capital theory relies on the premise that labor market is meritocratic (Becker, 1993; Paulsen, 2001; Rosenbaum, 1986) when, in reality, labor market is never wholly meritocratic. Instead, workers must negotiate with potential employers to determine the market value of their educational investments (Anisef, Sweet, & Frempong, 2003). Prior literature has found that even with similar professional qualifications, foreigners who work in the U.S. job market tend to have lower career success than domestic workers (Cantwell & Lee, 2010; Chakravartty, 2006). Thus, recognizing the limitation of human capital theory and the possible career outcome difference between foreign-born and domestic workers, this study proposes neo-racism theory as the alternative competing framework for studying career outcomes of international master's recipients.

Neo-racism theory, also called new racism, is a type of discrimination based on culture and nationality rather than on race (Balibar, 1992; Barker, 1981; Hervik, 2004; Spears, 1999). As

defined by Balibar (1992), neo-racism is “a racism whose dominant theme is not biological heredity but the insurmountability of cultural differences, a racism which, at first sight, does not postulate the superiority of certain groups or peoples in relation to others but only the harmfulness of abolishing frontiers, the incompatibility of life-styles and traditions” (p.21). Neo-racism theory argues that cultural and nationality differences may be additional causes of discrimination against foreigners. Neo-racism occurs within a context that promotes the culture of individual enterprise as well as social and political individualism and considers the dominant culture superior, while the culture of immigrants that differs from the dominant culture is excluded and discriminated against (Balibar, 1992; Barker, 1981; Hervik, 2004; Spears, 1999). Therefore, notions of cultural or national superiority are the essential elements underlying neo-racism. It is worth noting that neo-racism and biological racism are not mutually exclusive; instead, they can coexist and share similar purposes, which are exclusion, denial of rights, and mistreatment toward outsiders in forming a cultural hierarchy (Balibar, 1992; Barker, 1981; Hervik, 2004; Spears, 1999).

By using qualitative data, researchers have found a negative influence of neo-racism on international students' college experiences. Although neo-racism was first used to explain the discrimination against immigrants in France (Balibar, 1992), Lee and Rice (2007) and Lee and Opio (2007) extended its application by studying international students in U.S. colleges. They uncovered a range of neo-racist encounters toward international students, ranging from verbal insults to physical assaults that stemmed from the international students being perceived as unwelcome outsiders in the U.S. Building on the neo-racism concept, Cantwell and Lee (2010) found that international postdoc researchers are also subject to the influence of neo-racism in research institutions. Specifically, researchers found that culturally specific stereotypes can

negatively affect postdocs' career advancement opportunities as they move toward their academic careers. They also found that the career opportunities of postdoc researchers are closely associated with their countries of origin (Cantwell & Lee, 2010). This study indicates that international master's recipients may be subject to the negative influence of neo-racism, not only on campus, but also in the U.S. labor market.

Although not conclusive, there has been some evidence indicating that foreign workers may be prone to discrimination in the U.S. labor market due to their foreign culture and nationality. Because American culture and ideals are largely shaped by a predominately Anglo-American heritage (Hirschman & Snipp, 2001), Whites continue to enjoy socioeconomic advantages in the labor market, including favorable job interviews, improved career opportunities, and higher labor market rewards when compared to racial minorities (Saenz & Morales, 2005). Similar to minorities, foreign-born workers appear to be at a disadvantage when it comes to labor market success. For example, when studying the work experiences of Asian Indian workers in U.S. IT industries, Chakravartty (2006) found that Asian Indian H-1Bs, including international student workers holding U.S. degrees, experienced overt and subtle discrimination both inside and outside the workplace. These workers were paid lower wages and worked longer hours than their domestic counterparts, suggesting both racial discrimination and neo-racism.

When analyzing the disadvantaged career outcomes for international students with Australian degrees, Robertson et al. (2011) argued that, for international students, the market value of western degrees is lessened when they compete with domestic students who hold the same qualifications, likely due to discrimination or language and cultural barriers. In general, international students differ greatly from domestic students in cultural awareness, language

communication, and local network support (Arkoudis et al., 2009; Robertson et al., 2011). With these cultural, language, and network deficiencies, international master's recipients may experience neo-racism in the U.S. labor market. The influence of this neo-racism may lead to significantly unequal returns on educational investment for international master's recipients when compared to their domestic peers.

It is worth noting that international master's recipients are more likely to be influenced by neo-racism in the early stages of their careers. Due to H-1B regulations, the majority of foreign temporary workers experience restricted mobility that, in turn, makes them vulnerable to exploitation, lower pay, and longer working hours (Matloff, 2003) and limits their negotiating power (Lowell, 1999). Further, Lan (2013) found evidence that international students (who received U.S. degrees and worked in the U.S.) who gain permanent resident status have better career outcomes compared to temporary H-1Bs. Existing immigration regulations for foreign workers may result in a higher chance of being unequally treated by employers because international master's recipients may have little choice but to endure unfair treatment until they can successfully gain permanent residency.

In contrast to human capital theory, neo-racism theory suggests completely different hypotheses in terms of early career outcome differences between international and domestic master's recipients. First, given the fact that international master's recipients differ largely with domestic master's recipients in terms of culture, according to neo-racism theory, international master's recipients as a group may have significantly different career outcomes as compared to domestic master's recipients, due to the possible negative influence of neo-racism. Furthermore, international master's recipients may differ greatly from domestic master's recipients, even majoring in the same field or graduating from the same institution.

Neo-racism suggests the extent to which international master's recipients suffer from this new discrimination in the labor market may be not universal but instead could differ by nationality. Because countries of origin vary widely in terms of cultural match with the U.S., studying the career success of international master's recipients by country of origin is warranted. Previous literature on the college experiences for immigrants in the U.S. labor market has indirectly supported this view. In studying discrimination toward international students on college campuses, Lee and Rice (2007) found students from Asia, India, Latin America, and the Middle East reported considerable indirect or direct discrimination, whereas students from countries such as Europe, Canada, and New Zealand did not report any direct negative experiences related to their race or culture. Because of their visible racial minority status and foreign culture, immigrants from non-European backgrounds experience lower economic achievement than immigrants of European origin (Bratsberg & Ragan, 2002; Hou & Balakrishnan, 1996; Phythian et al., 2010; Reitz & Breton, 1994). Thus, based on neo-racism theory, this study hypothesizes that international students from countries that are culturally similar to the U.S. enjoy better career outcomes than those from countries that are culturally distinct from the U.S.

In sum, the combined literature on international students, coupled with the theoretical perspective of neo-racism, leads to the hypothesis that international master's recipients may be significantly disadvantaged in the U.S. labor market compared to their domestic peers due to their international status. Due to the negative influence of international status on career outcomes, international master's recipients may be less likely than their domestic peers to reap the benefits of attending selective colleges and majoring in high-paying fields. Further,

international students from countries that are culturally similar to the U.S. likely enjoy better career outcomes than those from countries that are culturally distinct from the U.S.

Summary

Neo-racism and human capital theory provide an appropriate framework for this study to gauge the career gaps between international and domestic master's recipients. Human capital theory hypothesizes that as two groups, international and domestic master's recipients do not have significantly different career outcomes in the U.S. job market because they have the similar knowledge and skills by investing in the similar U.S. academic master's programs. In addition, international master's recipients do not differ significantly with domestic master's recipients even with the same field of study and degrees from institutions with similar college quality. On the other hand, based on neo-racism theory, international master's recipients as a group may have significantly disadvantaged career outcomes as compared to domestic master's recipients. In addition, international master's recipients may differ significantly with domestic master's recipients even with the same field of study and degrees from institutions with similar college quality. Further, international students from countries that are culturally similar to the U.S. likely enjoy better career outcomes than those from countries that are culturally distinct from the U.S.

Chapter 3: Literature Review

This section provides an overview of international students working in the U.S. with an emphasis on the basic stay trends, their economic contributions, and the challenges they face in the labor market. Further, this section provides a detailed review of the literature on major-job match, salary, and job satisfaction that are related to international master's recipients. It is worth noting that since little research has been done to study the employment outcomes of international master's recipients, this review is expanded to cover studies on both domestic students and foreign-born immigrants. Given that international master's recipients share similar immigration backgrounds with immigrants and attend the U.S. institutions with domestic master's recipients, an examination of previous literature on immigrants and domestic graduates can provide an enriched understanding of career success of international master's recipients.

Research on International Students

Prior literature focuses on the trend of international students studying and working in their U.S., their contributions to the U.S. economy, and the challenges international students face in both job searching and, later, in the workplace. This literature provides an overview of international students' transition from colleges to the workplace and identifies possible barriers that might influence career outcomes of international master's recipients.

The trend of international students studying and working in the U.S. With the increasing influx of international students into postsecondary institutions in the U.S., the number of international students who have stayed and worked in the U.S. appears to have gradually increased as well. In the context of the globalization of the U.S. economy and internalization of U.S. higher education, the prestige and recognized quality of higher education worldwide have made the U.S. by far the largest host country for international students (Altbach, 2004). A unique

characteristic of the current international student mobility trend is the rapid growth of international students at the master's level. For instance, 208,355 international students studied at the master's level in 2014/15, representing a dramatic increase of 71.45% as compared to international master's students (a total of 121,523) in 2004/05 (IIE, 2015). By comparison, from 2004/05 to 2014/15, the total number of international students at the doctoral level only increased by 15.69% (118,104 in 2014/15 vs. 102,084 in 2004/05). Accordingly, an increasing number of international students at the master's level acquire their U.S. credentials and enter the job market in the U.S. For example, international master's recipients acquired 12% of the 757,387 master's degrees awarded in the U.S. in 2012, and, this figure is even higher in engineering fields, where 41% of master's degrees were conferred on international students. During 2000-2009, with international students at master's level pursuing U.S. higher education in increasing numbers, the proportion of international master's recipients who stay and work in U.S. has increased as well. Previous research has found that of all temporary foreign workers employed in the U.S. (H-1B visa holders), the proportion of international students who stayed and worked in the U.S. (mostly with master's and doctoral degrees) has increased from 43% (57,190) in 2000 to 62% (79,980) in 2009, surpassing the percentage of temporary foreign workers, most of whom were not educated in the U.S. Although international student workers were disproportionately employed in information technology industries (42% of foreign temporary workers), they also worked at research institutions (7%) and higher education institutions (Government Accountability Office, 2010).

The contribution of international master's recipients to the U.S. economy. Those international students who acquired U.S. degrees and worked in the U.S. are commonly considered as valuable sources for the workforce and have made significant contributions to the

U.S. economy (Stephan & Levin, 2003; U.S. Bureau of Labor Statistics, 2014; Wadhwa et al., 2009). In general, international students who stay in the host countries increase the host country's pool of highly-skill workers, providing a young workforce for developed countries that are typically characterized by declining birth rates and aging populations. These international students are also more attractive for employers than foreign-educated workers because of their local experience in the U.S. (Arthur & Flynn, 2011). Indeed, international students who receive U.S. degrees, especially those who worked in STEM fields (science, technology, engineering, and mathematics), have been considered a coveted pool of talent that is critical for America to maintain a competitive advantage in the knowledge-based global economy (National Academy of Sciences, 2007; Organization for Economic Cooperation and Development, 2008; Shachar, 2006). Thus, from a global perspective, the U.S. has considered the highly skilled international U.S. degree recipients crucial to the modern knowledge-based economy (Stephan & Levin, 2003; Wadhwa et al., 2009; Ziguras & Law, 2006). Among developed countries that strive to keep and attract foreign talent, the focus on international students has expanded from considering their contributions to postsecondary institutions as temporary students to their human capital potential as permanent skilled immigrants (Arthur & Flynn, 2011; Hawthorne, 2006).

Challenges faced by international master's recipients in U.S. labor market. Despite their important contributions to their host country's economy, international students at master's level face numerous unique challenges in transitioning from postsecondary institutions to the job market and to working in the U.S. Research has described the transition from international students to workers as "multicultural challenges" (Sangganjanavanich, Lenz, & Cavazos, 2011, p.18). Indeed, prior research has uncovered the culturally-based barriers to employment among international students, such as negative perceptions of an accent (Carlson & Mchenry, 2006),

unfamiliarity with available job options, and acculturation stress (Fritz, Chin, & Demarinis, 2008).

Even after successfully locating jobs in the U.S., international master's recipients may still face significant barriers in gaining career outcomes comparable to domestic master's recipients. First, international master's recipients might face the negative influence of discrimination based on race and international status. Although there has been a dearth of empirical evidence on the career outcomes of international students, some studies, most of which are based on qualitative interview data, indicate the disadvantaged career outcomes of international students compared to their domestic peers. Examining the experiences of international postdoctoral researchers (Postdocs), Cantwell and Lee (2010) found that international postdocs from non-western countries tend to have worse working conditions and less career advancement opportunities than those from western countries, which indicated the influence of discrimination based on foreign culture and nationality instead of race. Cantwell and Lee (2010) argued that international status is more than a legal category and that it is defined by a sense of alienation and discrimination. In studying career outcomes of Indian workers in the U.S. IT industry, Chakravartty (2006) also uncovered that Indian workers tend to work longer hours and earn less than domestic workers. They are also vulnerable to racial stereotypes and discrimination associated with American nationalism and nativism.

In addition to facing possible discrimination in U.S. job market, international master's recipients' career success may be further restricted by immigration regulations, which largely limits their freedom to change jobs. International students who are professionals with a baccalaureate or higher degrees have to apply for the H-1B temporary visa through their employers in order to legally work in the U.S. The visa permits a three-year stay that is

renewable for another three years and permits a change of employers upon issuances of the new visa. The H-1B currently has a numerical limit of 65,000 total visas with an additional 20,000 visas set aside for foreign graduates of U.S. colleges. In order to obtain an H-1B visa, the employer must first file a labor condition application (LCA) to the Department of Labor and attest that they will pay the prevailing wage and comply with conditions intended to protect U.S. workers from undue competition (USCIS, 2015).

While this immigration policy toward temporary workers in the U.S. provides international students opportunities to legally work in the U.S., it imposes a variety of constraints. First, due to the extra legal costs and uncertainty of gaining H-1B status, these immigration regulations have been reported to discourage potential employers, partially in small firms, from employing international students (Gribble, 2014; Lan, 2013). Second, the annual cap for H-1B visas (65,000 visas for all foreign workers, with an additional 20,000 visas for foreign graduates of U.S. colleges with masters and higher degrees) largely restricts opportunities for international students who are qualified for jobs in the U.S. labor market. More importantly, H-1B visa regulations significantly limit foreigners' ability to change jobs before they can get permanent residence status. Because the H-1B visa is tied to a specific employer, foreign temporary workers risk the possibility of losing their working visas if they switch jobs (Lan, 2013). Due to H-1B regulations, the majority of foreigner temporary workers may be more likely to be forced to remain with their sponsoring employers until they can obtain permanent residence status, which usually takes five to six years. The restricted mobility of H-1B workers makes temporary foreigner workers vulnerable to exploitation in the form of lower pay and longer working hours (Matloff, 2003) and constrains their negotiating power to gain better career outcomes (Lowell, 1999). A study by Lan (2013) found strong empirical evidence that

permanent residence status brought greater job opportunities, reduced restrictions related to the temporary work visas, and improved the quality of the job match, which indirectly confirms the adverse effect of being foreign temporary workers on career outcomes.

Summary. In sum, this review of previous literature indicates that as the increasing number of international students at master's level study and work in the U.S. job market, international students with master's degree from U.S. institutions have become increasingly important contributors to the development of the U.S. economy (Stephan & Levin, 2003; U.S. Bureau of Labor Statistics, 2014; Wadhwa et al., 2009). However, the ability to convert their U.S. credentials into career success for international master's recipients may be strongly limited by possible discrimination against foreigners (Cantwell & Lee, 2010; Chakravartty, 2006) and by the immigration regulations that could restrict their career mobility and career success (Lan, 2013; Matloff, 2003). Given the lack of studies on career outcomes of international master's recipients, this study can contribute to the prior literature by systematically studying three measures of career success of international master's recipients (major-job match, salary, and job satisfaction).

Research on Major-job Match

This section reviews previous literature that is concerned with the importance of studying major-job match, immigrants' major-job match, relationships between college experience and major-job match, and other influential factors in major-job match.

The importance of studying major-job match. The connection between major-job match has been defined as the congruence between academic training and occupational choice and is often measured by how college graduates' primary job is related to their field of study (Wolniak & Pascarella, 2005; Xu, 2012). There has been increasing interest in higher education

research for studying consistency between academic training and occupational choice of college graduates (Bender & Heywood, 2011; Robst, 2007; Xu, 2012). Studying major-job match is important for individual college students, their institutions, and society as a whole. For individual students, the mismatch between college training and occupations often has significant negative effects on monetary and non-monetary career outcomes, such as earnings, job satisfaction, turn-overs, and regrets of enrolling (Bender & Heywood, 2011; Kucel & Vilalta-Bufi, 2012; Nordin, Persson, & Rooth, 2008; Robst, 2007; Xu, 2012). For postsecondary institutions and society, the disconnect between college education and career choices among college graduates can be considered as a waste of public investment in higher education in the sense that individual students' higher education costs are subsidized by public funding (Bender & Heywood, 2011; Nordin et al., 2008).

Research on immigrants' major-job match. Prior literature studying foreign immigrants, most of whom did not hold U.S. postsecondary degrees, revealed that immigrants were more likely to hold jobs unrelated to their college major in the host country compared to domestic workers (Arbeit & Warren, 2013; Dean, 2009; Frank, 2009; Trevelyan & Tilli, 2010). This line of previous research suggests that international master's recipients may be more likely to suffer from major and job mismatch compared to their domestic peers.

By examining the Survey of Labor and Income Dynamics 2001 to 2006, a nationally representative longitudinal dataset in Canada, Dean (2009) found strong evidence that immigrants had a lower incidence of working in education-related jobs than did domestic-born Canadians. The degree of mismatch is also found to be much higher among highly skilled workers, namely university-educated workers, than for immigrants without a foreign college education. Dean (2009) attributed immigrants' mismatch in the Canadian labor market to two

primary reasons. First, degrees or skills acquired through foreign education can not be fully compatible with the skills requirements of the host country; thus foreign credentials are devalued in the Canadian labor market, which partially leads to the mismatch. Second, compared to their Canadian-born counterparts, foreign immigrants were disadvantaged in language skills, social and professional networks, and knowledge of the labor market; hence, foreign immigrants are less likely to locate jobs that match their foreign degrees. Interestingly, Dean (2009) found evidence that the extent of major and job mismatch appears to differ by country of origin, measured aggregately by regions. Specifically, immigrants from western regions had more success finding jobs related to their majors than immigrants from the Middle East and Asia because credentials from western countries were less likely to be devalued in Canada (Dean, 2009).

The higher probability of major-job match for immigrants as demonstrated in prior research was generally supported by Arbeit and Warren (2013). By studying immigrants in the U.S. labor market, Arbeit and Warren (2013) found that, with regard to the effects of degrees on major-job match, U.S. degrees are the most influential, followed by degrees from countries that are predominantly White and English-speaking, and finally by degrees from Asian and African countries. Building on Dean (2009) and examining immigrants in the Canadian labor market by using a nationally representative dataset, Frank (2009, 2013) studied the effect of socio-demographic factors, such as visible minority status and area of residence, on the rate at which immigrants obtained jobs compatible with their foreign education. Despite the structural barriers faced by immigrants (such as devalued foreign credential, lack of local network, and low language skills), Frank (2013) argued that the status of being an outsider is actually the potential hindrance to immigrants' general employment success, including major-job match. In order to

maintain its power, the dominant group in society tends to limit the resources of other groups, which may create difficulties for immigrants in gaining access to jobs in their fields, especially in the professional occupations with higher monetary and prestige rewards. Relying on this theoretical framework, Frank (2013) confirmed the negative effect of being foreigners in the Canadian labor market, finding evidence that visible minority status of immigrants has a negative effect on the rate at which immigrants obtained major-related jobs. Further, immigrants who sought high-status occupations obtained job matches at a slower rate than those seeking lower-status occupations. The findings that immigrants are disadvantaged when it comes to obtaining a major-job match compared to natives are also supported by a large number of studies conducted in Canada, Australia, and the U.S. (Arbeit & Warren, 2013; Boyd & Thomas, 2001; Dean, 2009; Frank, 2009, 2013; Man, 2004; Trevelyan & Tilli, 2010).

For international students who graduated from U.S. institutions and worked in the U.S. labor market, gaining U.S. degrees can, to some extent, ameliorate the penalty of being foreigners when finding jobs related to their college training, as confirmed by Arbeit and Warren (2013). However, they are still subject to the negative influence of being foreigners in the U.S. labor market compared to their domestic peers. There is little doubt that studying in the U.S. and earning U.S. credentials may facilitate international master's recipients to overcome the structural barriers of language skills, local networks, and local degrees, international students. However, international master's recipients may be essentially considered as "outsider (s)" rather than as part of the dominant group, and this perceived status may negatively affect their major-job match compared to their domestic peers (Frank, 2009; p. 81).

Despite the lack of empirical studies on major-job match of international master's recipients, Robertson, Hoare, and Harwood (2011) found qualitative evidence that despite

qualifications, international students in Australia were less likely to find jobs that highly matched their field of study compared to domestic students, possibly due to discrimination and structural barriers. In studying the working experiences of highly-skilled workers from India in the U.S. IT industries (including workers with and without U.S. degrees), Chakravartty (2006) found that Asian Indian foreign workers are exposed to “both overt and subtle forms of racial discrimination as well as renewed xenophobi and nativist sentiments” (p. 38). The evidence, therefore, strongly indicates that international master’s recipients, as a group, may be less likely to have jobs related to their majors than their domestic peers. In addition, based on the potential country of origin effect on major-job match, as found by Frank (2009) and Arbeit and Warren (2013), it is expected that country of origin may play an important role in shaping career success of international master’s recipients, such as major-job match.

Research on major, college quality and major-job match. Despite the obvious differences stated above between international and domestic students at the master’s level, both groups are similar in that they are investing in U.S. higher education. Given the relatively consistent positive relationship between individual investments in higher education and employment returns (Keane & Wolpin, 1997; Melguizo & Wolniak, 2011; Thomas, 2003; Thomas & Zhang, 2004; Thomas, 2005), it is necessary to review the role college education has played in shaping major-job match. Using the 1993 National Survey of College Graduates (NSCG) from the National Science Foundation, Robst (2006) found that in general, college graduates majoring in STEM fields and health professions had a higher likelihood of finding jobs related to their field of study than those majoring in social sciences and liberal arts. From the human capital perspective, Robst (2006) attributed the congruence between field of study and occupations as a form of skill transferability. This research argued that some college majors,

such as STEM and health majors, often offer occupation-specific skills and thus provide students with clear occupational choices in the labor market, whereas social sciences and liberal arts majors equip graduates with general skills that might be easy to transfer to other occupations (Robst, 2006). A number of subsequent studies supported the influence of field of study on major-job match (Robst, 2007; Robst et al., 2012).

As informative as these studies appear, they failed to consider the influence of other important aspects of investments in college education, such as college quality. Extending the previous studies by accounting for individual and institutional characteristics in major-job match, Xu (2012) provided an important perspective, concluding that career outcomes of college graduates, such as major-job match, are closely related to institutional effectiveness and student success. To further illustrate, “the responsibility of the higher education system is not to hand out more diplomas, but to produce a quality workforce that meets the need of the national labor market” (p. 378). Xu (2012) empirically supported the important effects of institutional characteristics in shaping major-job match. In Xu’s study (2012), institutional characteristics, such as Carnegie classifications, were considered as a measure of social capital since institutions may help graduates succeed in the labor market by providing access to resources, information, and networks useful for job searches. Accordingly, Xu (2012) found that a higher rank in Carnegie classification was significantly linked to the increased likelihood of choosing a major-related job among non-STEM graduates (Xu, 2012).

It appears that field of study and institutional characteristics all play important roles in influencing the major-job match of college graduates. However, the magnitude of the influence of major and college quality seems to differ for international and domestic master’s recipients. Prior research on immigrants’ disadvantaged major-job match seems to suggest that even within

the same field of study and with degrees from similarly selective institutions, international master's recipients may be still less likely than domestic master's recipients to find jobs that highly match their field of study.

Other influential factors in major-job match. Previous studies have documented various factors that may have significant effects on major-job match. These factors include demographic factors, educational backgrounds, and labor market characteristics. These factors will be accounted for in this study to help estimate how international status affects the probability of locating jobs related to their majors for international master's recipients, relative to domestic master's recipients.

Several demographic factors have been found to have impacts on major-job match. The first demographic factor associated with major-job match is gender. In studying college graduates, Robst (2006) found that male college graduates are more likely to report mismatch between major and job than female graduates. Robst (2007) further found that male college graduates consistently report pay and promotion opportunities or changes in career interests as the most important reasons for the mismatch, while female college graduates cited family-related reasons as the most important reasons for the mismatch. Xu (2012) found evidence that the consistent gender effects only exist among non-STEM graduates instead of STEM graduates.

Race/ethnicity is another demographic variable that is related to major-job match, although the literature on the effects of race on major-job match is mixed. Among college graduates, Robst (2006) found that the likelihood of mismatch among college graduates is higher for Whites and Asians than Blacks, Native Americans, or Hispanics. Xu (2012) did not find consistent evidence of the gender effect among STEM graduates, but did find, among non-STEM graduates, that Asian graduates seem to be more likely to have jobs somewhat related to their

undergraduate majors than their White counterparts. Focusing on immigrants, Frank (2013) found visible racial minorities in Canada obtained employment related to their college major at a slower rate than non-visible minority immigrants.

Both age and marital status are also related to major-job match. Robst (2006) found that never-married individuals have a greater likelihood of mismatch than those who are married, which remains consistent across men and women (Robst, 2006). Robst (2006) also found that the likelihood of mismatch increased with age, which was partially supported by Xu (2012). Xu (2012) found evidence that the age of graduates when receiving their bachelor's degree was closely related to major-job match among non-STEM graduates, with younger college graduates (younger than 30) having significantly decreased odds of having major-related jobs than older graduates.

Additionally, family background seems to influence major-job match. However, the effect of family background on major-job match differs by field of study (STEM vs. non-STEM). Xu (2012) found that among STEM graduates, higher family incomes are associated with the higher likelihood of choosing major-related jobs. Parental education also seems to have positive relationships with the degree of relatedness between major and job for graduates.

Another demographic factor, language skills, is closely associated with major-job match among immigrants. Research indicates that the higher an immigrant's proficiency in English or French in Canada, the more quickly the immigrant obtained a job related to college major (Frank, 2013).

Lastly, labor market contexts may need to be accounted for when studying major-job match issues. Xu (2012) found job status, measured as part-time or full-time, impacts major-job match, with part-time graduates more likely to hold non-major-related jobs than full-time

graduates. Frank (2013) revealed that immigrants living in smaller cities actually had a higher likelihood of finding jobs related to their foreign majors than did those in big cities because immigrants in small cities may, in fact, be seen as more valuable resources for the local economy than immigrants in large cities.

In sum, with the exception of English-proficiency, all of these factors are included in this study as controlled variables in order to examine the net effect of international status on the probability of gaining jobs related to their majors in U.S. job market.

Research on Earnings of College Graduates and Immigrants

During the past few decades, the links between college attendance and economic return (primarily measured as salary) have been heavily studied from various theoretical perspectives by researchers from disciplines as diverse as economics, sociology, and education. In general, these studies fall into two categories, based on the focus of their analyses: 1.) earning inequity of racial minorities as compared to Whites and immigrants relative to domestic workers (Bratsberg & Ragan, 2002; Chiswick & Miller, 2007; Kim & Sakamoto, 2010; Kim & Zhao, 2014; Sakamoto & Furuichi, 2002; Zeng and Xie, 2004). 2.) Earnings of college graduates (Berger, 1992; Eide, 1994; Grogger & Eide, 1995; James, Alsalam, Conaty, & To, 1989; Rumberger, 1984; Rumberger & Thomas, 1993; Thomas, 2000, 2003; Thomas & Zhang, 2005; Zhang, 2005; Zhang, 2008). An overview of the literature on employment outcomes of racial minorities, immigrants, and college graduates is closely related to the research on the salary gap between international and domestic master's recipients because prior literature on earning outcomes of general college graduates provides a better understanding of how college education may influence earnings after graduation. Further, the literature on the economic return to immigrants and racial minorities on their higher education investment can help illuminate why international

master's recipients face a significant wage penalty in the U.S. labor market as compared to domestic master's recipients.

A review of literature on earnings of racial minorities and immigrants. Given the lack of research studying labor market outcomes of international master's recipients, this review focuses on examining literature on the earnings of foreign immigrants and racial minorities. International master's recipients are similar to immigrants in their foreign status as well as with racial minorities in terms of minority status, thus this review can provide useful insights for studying the earning disadvantage of international master's recipients.

Prior literature on the career success of immigrants suggests that all else being equal, immigrants may have lower pay compared to domestic workers, possibly due to discrimination toward foreigners. Previous studies focusing on immigrants in general suggested that, in addition to deficiency in language and devalued foreign degrees (Bratsberg & Ragan, 2000; Chiswick & Miller, 2007; Ze & Xie, 2004), discrimination might also lead to lower return on immigrants' foreign education. Building on the human capital framework, a large body of research has consistently found that the earning gaps between immigrants and native-born workers can be explained by their human capital factors, such as language proficiency and devalued foreign education (Bratsberg & Ragan, 2000; Chiswick, 1978; Chiswick & Miller, 2007; Miranda & Zhu, 2012). Yet, a number of studies have argued that discriminatory practices in the host country diminished the labor-market value of immigrants' human capital; thus, immigrants were penalized for their foreign status (Boyd & Thomas, 2002; Phythian, Walters, & Anisef, 2010).

From a sociological perspective, relying on the argument that earning inequity may be attributed to racial and ethnic discrimination, a great number of studies have found empirical evidence that racial minorities are, in fact, significantly penalized in the labor market due to their

minority status (Kim & Sakamoto, 2010; Kim & Zhao, 2014; Sakamoto & Furuichi, 2002; Zeng & Xie, 2004). For instance, Kim and Sakamoto (2010) found that only male Asian Americans who immigrated at a young age and completed high school in the U.S. appeared to achieve full parity with Whites in terms of earnings. By contrast, male Asian Americans who immigrated after high school and completed their highest degree in the U.S. still lagged behind their White peers in terms of earnings (Kim & Sakamoto, 2010). For female Asian Americans, Kim and Zhao (2014) found evidence that, regardless of their immigration background and U.S. education experience, female Asian Americans are all disadvantaged compared to White females when it comes to unemployment, annual earnings, and number of people supervised.

The disadvantaged status in earnings for Asian Americans resonates with previous studies on international students and foreign workers. Prior literature has demonstrated that international students and postdoc researchers may be more likely to be discriminated against on campus and in the workplace due to their foreign status (Cantwell & Lee, 2010; Lee & Opio, 2007; Lee & Rice, 2007). Thus, prior literature on the disadvantaged earnings for Asian Americans and the possible discrimination against international students and postdoctoral researchers suggests that international master's recipients, mostly Asians, may be likely to suffer in earnings possibly due to the negative influence of both racial minority and international status.

Taken together, an examination of previous literature on the earnings of Asian Americans and immigrants suggests that international master's recipients may face a significant salary penalty in the U.S. labor market due to their foreign status and racial minority status. Thus, in order to study the net effect of international status on earnings, their racial minority status should be controlled for in this study as the majority of international master's recipients are also from Asian countries.

An examination of prior literature on earnings of college graduates associated with major and college quality. This section reviews literature that is concerned with how major and college quality influence earnings, as well as how to measure college quality and how the effects of college quality on earnings differ by sub-populations. The review of this line of research can help explain whether international master's recipients are less likely to convert their U.S. college degree into labor market rewards, even with the same field of study and with degrees from similarly selective institutions.

The private rate of return on college education has been the focus of volumes of studies in educational research (Berger, 1988a, 1988b; Eide, 1994; Grogger & Eide, 1995; James, Alsalam, Conaty, & To, 1989; Rumberger, 1984; Rumberger & Thomas, 1993; Thomas, 2000, 2003; Thomas & Zhang, 2005; Zhang, 2005; Zhang, 2008). The literature on the economic return on college education has predominantly relied on the human capital framework, which asserts that the labor market rewards investments that individuals make in education and training, and these investments lead to improved salaries in the labor market (Becker, 1993). Drawing upon the human capital theory, previous literature has consistently found close links between the magnitude of the earning premium and field of study and college quality. First, choice of academic major has a statistically significant impact on earnings, which suggests that STEM majors, on average, earn more than non-STEM majors (Thomas, 2000, 2003; Thomas & Zhang, 2005; Zhang, 2005). Moreover, the field of study effect on earnings seems to increase over time (Berger, 1988; Thomas, 2000; Thomas & Zhang, 2005). In addition to the influence of field of study on earnings, prior literature has consistently found evidence that the stratification in college quality results in the different economic returns to higher education investments (Rumberger & Thomas, 1993; Thomas, 2000, 2003; Thomas & Zhang, 2005). Specifically,

graduates from more prestigious and selective colleges enjoy significant earning premiums relative to peers graduating from less academically distinctive institutions (Brewer & Ehrenberg, 1996; Fox, 1993; Mueller, 1988; Rumberger & Thomas, 1993; Smart, 1991; Solmon, 1973; Thomas, 2000, 2003; Thomas & Zhang, 2005; Trusheim & Crouse, 1981; Zhang, 2005). Building on the premise of human capital, a possible explanation for the link between earning premiums and college selectivity is that high-quality colleges appear to provide students with better academic resources for human capital improvement and thereby may produce more productive college graduates than low-quality institutions (Sweitzer & Volkwein, 2009). While the effects of institutional quality on earnings are generally consistent, there have been studies that produced mixed findings. For instance, a study found that there was no statistically significant relationship between attending a college ranked in the top tier by *U.S. News and World Report* and the wage earned by graduates (Owings-Edwards, 2011). In a 2011 study, Dale and Krueger (2011) argued that the prestige of a college was not significant in predicting the higher earnings.

As indicated above, the economic return on the U.S. college education for international master's recipients is likely to be strongly influenced by field of study and institutional quality. What is missing from prior literature, however, is whether international master's recipients are less likely than domestic master's recipients to convert their U.S. college degree into labor market rewards, even with the same field of study and with degrees from similarly selective institutions. A number of previous studies have implied that the institutional effect and field of study effect on career outcomes may be not universal to all college graduates but rather vary by individual characteristics. Karabel and McClelland (1989) argued that individuals and groups possess different forms and amounts of resources and these variations in resources are crucial

determinants of converting educational credentials into rewards in the labor market. The significant contribution of this study to the institutional effect literature is the finding that institutional effect on earnings is not universal to all but rather vary by family of origin. It appears that college graduates from high-status family origins were more likely to convert increments in college prestige into labor market success. Using data from the National Longitudinal Survey of Youth, Monks (2009) found that there is, in fact, heterogeneity in the magnitude of the returns to institutional quality as measured by Barron's Profiles of American colleges based on race and gender. More specifically, Monks (2009) found that males receive a higher return from a graduate-degree granting universities and from a private institution than do females and non-Whites. Borgen (2015) investigated the heterogeneous returns on college quality across the wage distribution, using Norwegian administrative data, and found strong evidence that students from privileged background are not only more likely to attend high-quality colleges, but are also more likely to convert their high-quality college education into success at the labor market. As Borgen (2015) argued, perhaps students from privileged backgrounds can use family connections to convert their educational credentials into high pay. Although this finding may not completely apply to U.S. college graduates due to the possible differences in higher education systems between Norway and the U.S., a most recent study focusing on the hiring practices at some of America's most prestigious firms lends strong support to this view. Building on in-depth interviews as well as firsthand observation of hiring process of top-tier U.S. investment banks, consulting firms, and law firms, Rivera (2015) found that the ways that employers define and evaluate merit are strongly associated with applicants from economically privileged backgrounds. At every step of the hiring process, applicants from privileged backgrounds are more likely to land these highest paying jobs than those who from

less privileged families. Rivera (2015) further concluded that Americans are taught to believe that working hard is the key to pursue the upward mobility, and yet it is often the case in reality that those from affluent backgrounds who land the best jobs.

In the case of international master's recipients, the review of literature above indicates that international master's recipients may be less likely than domestic master's recipients to convert their U.S. credentials and their professional expertise into labor-market success. Even from privileged families in foreign countries, international master's recipients still face the deficiency in language skills, cultural awareness, and local networks as well as the discrimination against their foreign culture (Arkoudis et al., 2009; Robertson et al., 2011), thus it is necessary to study to what extent international master's recipients differ from domestic master's recipients in converting their U.S. credentials and professional expertise into career success in the early stage of their careers in U.S. job market.

In measuring college quality, previous studies have commonly used Carnegie classification and institutional control to study the college quality effect. For instance, by analyzing the National Longitudinal Survey of Youth data to study the economic return to institutional quality, Monks (1999) used institutional control, Carnegie Classification, and selectivity rankings from Barron's Profiles of American Colleges to explore the institutional effect on economic outcomes. Furthermore, by using the selectivity ranking in Barron's Profiles of American Colleges and institutional control as measures of quality, Zhang (2005) analyzed the links between the rate of earning growth and institutional quality and major. In studying the salary gap between Asian Americans and whites, Kim and Sakamoto (2010) used Carnegie classification as a proxy for institutional selectivity. Following previous studies (Monks, 1999; Kim & Sakamoto, 2010), this study plans to use Carnegie classifications and institutional control

to capture the institutional quality effect. Carnegie classification was created to meet the needs of particular institutional analyses, and it has become “the dominant—arguably the default way—that researchers characterized and controlled for differences in institutional mission” (McCormick & Zhao, 2005, p.52). Besides, although Carnegie classification is not intended to measure college selectivity, the two are highly correlated (Kim & Sakamoto, 2010). Further, previous research on the effect of college quality on earnings has predominantly focused on undergraduate education rather than graduate education, thus how the institutional quality impact graduate students’ earning outcome is generally unknown. Thus, this study can contribute to the prior literature on institutional quality and career outcomes by examining how institutional quality affects college graduates at the master’s level instead of at bachelor’s level.

Other influential factors on earnings. Previous studies have documented additional factors that may be closely associated with earnings of international master’s recipients. These factors include demographic, educational and job market characteristics, which will be included in the earning analysis as covariates.

First, demographic factors, such as gender, race/ethnicity, and age, have been found to be related to earnings. Gender has been consistently reported to have significant impacts on earnings, with female college graduates experiencing a significant earnings penalty. Rumberger and Thomas (1999) found that the starting salaries of female college graduates were about 5% lower than males after controlling for college, family background, and labor market variables. Thomas (2000, 2003) also found that female graduates not only suffered significantly lower starting salaries but also had a higher ratio between college debt and salary, Thomas explained that this gender effect may be due to the fact the female students were more likely to major in non-STEM fields and work in low-paying fields, such as education. Supporting the previous

findings of gender effect, Thomas and Zhang (2005) further found evidence that the gender gap in earnings actually increased right after graduation to four years after graduation.

Literature on the effect of race on earnings has been mixed. With a focus on college graduates, Rumberger, and Thomas (1999) discovered no earnings disadvantage for racial minority graduates and found that Hispanic females actually earn 7% more than White female graduates after controlling for relevant factors. Partially supporting this finding, Thomas (2000, 2003) also found evidence that minority graduates had earnings and debt ratios comparable to those of their White counterparts. Thomas (2005) further confirmed previous findings regarding earnings of racial minorities and found that all other things being equal, there were not large earning gaps between racial groups, although Hispanics and Asians did enjoy a slight earnings premium on average. However, a great number of research studies have found that all three native-born racial/ethnic minorities (Asian, Black, and Hispanic) are at a net earning disadvantage relative to their native-born White counterparts (Kim, 2015; Kim & Sakamoto, 2010; Kim & Zhao, 2014). In terms of immigrants, Kim and Sakamoto (2010) found that only male Asian Americans who immigrated at a young age and completed high school in the U.S. appeared to have full parity with Whites in terms of earnings, while male Asian Americans who immigrated after high school and completed their highest degree in the U.S. lagged behind their White peers in terms of earnings.

Age has also been reported to be important in shaping immigrants' labor market outcomes. In analyzing the labor market outcomes of immigrants in Canada, Schaafsma and Sweetman (2001) found that immigrants who arrived later in life had lower returns on average, despite foreign labor market experience and foreign education. Age at immigration also matters because younger immigrants acculturate more easily. This age effect was found among college

graduates by Thomas and Zhang (2005), revealing that earnings are a concave function of both age and job tenure and that this age effect can be explained by the accumulation and depreciation of human capital (Becker, 1993).

While findings are mixed in the literature, family background has been found to influence earnings. In studying the economic return on undergraduate education, Rumberger, and Thomas (1999) found that family background as measured by parental educational level and parental professions did not influence starting salaries of college graduates. However, Thomas (2000) revealed that parents' working status in a professional category had a slight negative impact on the initial earnings of their children. Thomas (2005) also found that family income exhibited a small but statistically significant impact on earnings. Rivera (2015) further concluded that Americans are taught to believe that working hard is the key to pursue the upward mobility, but college graduates from affluent backgrounds are more likely to land the high paying jobs.

Studies that have examined wages of married men and unmarried men have consistently found that married men earn more than their unmarried counterparts. Researchers have found that all else being equal, male marriage wage premiums range from 10 percent to 50 percent (Antonovics & Town, 2004; Lincoln, 2008). Among immigrants in the U.S. labor market, Fogg and Harrington (2012) found that married male college-educated immigrants, on average, earned 14% percent more than unmarried men. Fogg and Harrington (2012) explained that one possible reason may be that men are more productive in the labor market because they tend to take on the responsibility for fewer household-related tasks.

Prior literature has also documented the significant influences of labor market experiences on salaries. Previous research found that students who work in a public sector suffer a significant earning penalty (Thomas, 2003). Research has found an influence of region of

employment on earnings. The varied economic conditions of the regional labor market and the cost of living differences among regions may influence worker salary (Fog & Harrington, 2012). Among college graduates, research has shown that graduates working in the Southern, Plains, or Rockies regions of the U.S. earn between 6 and 9% less than graduates employed in other parts of the country, regardless of the region in which they earned their degree (Thomas, 2003). In studying immigrants, Fog and Harrington (2012) also found that the hourly wages of immigrants who lived in the Northeast and the West regions of the U.S. were estimated to be higher than those who lived in the South (Fogg & Harrington, 2012). Furthermore, various empirical studies found evidence that wages are higher in large firms (Brown & Medoff, 1989; Oi & Idson, 1999; Reilly, 1995). Further evidence shows that a firm's size has a strong effect on IT worker's wage in the U.S. labor market (Levina & Xin, 2007).

Research on Job Satisfaction

The importance of studying job satisfaction. Previous literature on the career outcomes of college graduates has focused predominantly on the economic benefits that are mostly measured through earnings (Eide, Brewer, & Ehrenberg, 1999; Thomas & Zhang, 2005). Thus, researchers have understudied the non-monetary benefits of college attendance, such as job satisfaction. Job satisfaction, in particular, reflects important information regarding employee's economic, social, and personal life, and it is a primary determinant of labor-market mobility (Freeman, 1978; Hellman, 1997), job performance (Mount, Ilies & Johnson, 2006), and personal well-being (Rode, 2004). Further, researchers have argued that monetary benefits are only part of the occupational characteristics and that, in fact, non-monetary benefits might provide more comprehensive information about individuals' occupations (Duncan, 1977). Despite the importance of studying job satisfaction for college graduates, international master's recipients

actually are largely unstudied because previous studies on job satisfaction of highly skilled foreigners mostly focused on international doctoral recipients. Given the high competition for foreign talent among developed countries in a global knowledge-based economy (OECD, 2008; Shachar, 2006), a systematic investigation of job satisfaction with an emphasis on differences between international and domestic master's recipients could shed important light on how to attract and retain the best foreign talent in the U.S.

Research on job satisfaction of international faculty and immigrants. A variety of previous studies have examined the job satisfaction of international faculty and immigrants as compared to their native-born peers. This line of research showed that foreign status appears to be closely associated with job satisfaction. Focusing on foreign-born faculty, Corley and Sabharwal (2007) found that foreign-born scientists report lower work satisfaction than U.S.-born peers, even though research also found that foreign-born academic scientists and engineers are more productive than their U.S.-born peers in all areas. For those who were not in post-doc positions (which represents 90 percent of the sample), foreign-born scientists were less satisfied than U.S.-born scientists for all nine variable measures of work satisfaction (including advancement opportunities, job benefits, intellectual challenge, independence, location, level of responsibility, salary, job security, and contribution to society). The areas in which the foreign-born scientists lagged the most behind U.S.-born scientists were found in level of satisfaction with salary, level of responsibility, job security, and intellectual challenge. Sabharwal and Corley (2009) examined the job satisfaction patterns of scientists and engineers by status of birth using a very large and comprehensive National Science Foundation (NSF) dataset, the Survey of Doctoral Recipients (SDR). The results of the study indicate that foreign-born scientists and engineers are less satisfied in several areas of their work life compared to their U.S.-born peers.

Mamiseishvili (2011) also confirmed that foreign-born faculty members reported lower mean scores on all satisfaction and workplace perception measures than did U.S.-born faculty members.

Previous research also found that immigrants have lower job satisfaction compared to domestic workers. Yap, Holmes, Hannan, and Cukier (2013) found that that immigrants experience lower career satisfaction overall than native-born, workers and visible minority immigrants have lower career satisfaction than non-visible minority immigrants. Additionally, Kim, Kim, Jaquette, and Bastedo (2014) employed three NCES databases to study the job satisfaction of the high school classes of 1972, 1982, and 1992. Consistent with the previous findings, they found evidence that minority Black students who graduated from selective colleges had lower levels of job satisfaction compared to White and Asian graduates, likely due to the prejudice and discrimination against minorities in the labor market that limits their ability to convert college quality into labor-market rewards.

As a whole, the previous research indicates that, similar to international faculty and immigrants, international master's recipients might be less satisfied with their jobs compared to domestic master's recipients due to their foreign-born status, even after controlling for relevant influences.

Research on field of study, college quality and job satisfaction. In general, previous studies have found that field of study and college quality all have significant effects on job satisfaction. Wolniak and Pascarella (2005) analyzed the job satisfaction of 2,525 college graduates from 30 institutions and found that income and major as well as job congruence both mediated the major effects on job satisfaction. The influence of major on job satisfaction appears to be dependent on the congruence between major and workplace as well as income (Wolniak &

Pascarella, 2005). Kim et al. (2014) confirmed the positive associations between college majors and job satisfaction. A number of studies have attempted to study the relationship between college quality and job satisfaction. By studying the objective career success (pay and promotion) and subjective success (job satisfaction and career satisfaction) of 1,388 U.S. executives, Judge, Cable, Boudreau, and Bretz (1995) found that college quality and prestige, measured as attending an Ivy League institution, did not significantly affect job satisfaction. Examining the dataset of the Baccalaureate and Beyond Study (B&B: 93/03), Liu, Thomas, and Zhang (2010) found that after controlling for earnings and other relevant variables, college quality is negatively related to job satisfaction, likely due to the unmet expectations of attending elite institutions. They further found that the negative relationship between satisfaction with monetary rewards and college quality is mainly driven by the non-White group, as the effect of college selectivity on job satisfaction was not significant among Whites. Kim et al. (2014) further confirmed the negative effect of college selectivity as measured by Barron's Profiles of American Colleges on-the-job satisfaction and found that graduating from a highly competitive institution decreased the odds of reporting higher job satisfaction by about 20%, compared to graduating from a competitive institution. Moreover, they found that Black minority graduates from selective colleges had lower job satisfaction than their Whites and Asians peers, possibly because minorities have lower abilities to convert college quality into career rewards, such as job satisfaction, due to the discrimination against racial minorities in the labor market.

In sum, this review suggests that college quality and field of study may be closely associated with international master's recipients' job satisfaction, but as indicated by Kim et al. (2014), international master's recipients may have lower probability of being satisfied with their

jobs than domestic master's recipients, even they graduate from institutions with similar college selectivity.

Other influential factors in job satisfaction. A list of variables has been linked to international students' job satisfaction, so these variables will be included as control variables in the job satisfaction analysis. First, the positive relationship between income and job satisfaction has been well established, with income considered as of the most significant predictors of job satisfaction in previous studies (Judge, Cable, Boudreau, & Bretz, 1995; Kim et al., 2014; Liu, Thomas, & Zhang, 2010).

In terms of the function of major-job match on job satisfaction, Holland's (1997) theory of vocational behavior posited that the match between individuals' interests and environment both affect the extent of continuity in occupational decisions, which thereby may influence career outcomes, including job satisfaction. Based on this theoretical model, Wolniak and Pascarella (2005) found that field of study has significant impact on job satisfaction, but salary and major-job match mediate the major effect on job satisfaction.

Following previous research, a large number of demographic and labor market variables have been found to be associated with job satisfaction. Demographic variables, such as gender, race/ethnicity, age, marital status, number of children, and family background variables, such as parental education and family income, have been included in job satisfaction studies (Judge et al., 1995; Kim et al., 2014; Liu, Thomas, & Zhang, 2010). These demographic and family background variables may impact international students' job satisfaction because these variables likely represent the resources and privilege gained from their family background, which may significantly affect the ability to convert a college education into career rewards like earnings (Borgen, 2015) and job satisfaction (Kim et al., 2014; Liu et al., 2010). Labor-market variables,

such as sector, workplace location, number of work hours, and size of employer, will be included in this study as covariates (Judge et al., 1995; Kim et al., 2014; Liu, Thomas, & Zhang, 2010).

Chapter 4: Methodology

In this chapter, I first introduce the research questions guiding this research and datasets used in the analysis. Then, in the following sections, the dependent, independent and control variables examined in this study are illustrated. Lastly, the analytic methodology and limitations of this study will be explored.

Research Questions

The qualitative evidence explored in the previous literature suggests that international students who studied and worked in the U.S may have significantly disadvantaged career outcomes, such as worse working conditions, lower pay and longer working hours, as compared to domestic workers (Arkoudis, Hawthorne & Baik, 2009; Chakravarty, 2006; Cantwell & Lee, 2010). Drawing on the neo-racism theory, this study aims to explore whether international status has played a unique role in negatively influencing international master's recipients' early career outcomes and whether the effect of international status on career outcomes differs significantly by field of study and institutional quality. In addition, another question explored in this study is to examine whether countries of origin have played a significant role in shaping their career outcomes. Therefore, based on the previous literature and theoretical framework related to international students' career outcomes, the following research questions guide this analysis:

1. What are the descriptive characteristics of demographic, educational and job market factors for international and domestic master's recipients?
2. Does international status play a unique role in determining their job market outcomes (major-job match, salary, and job satisfaction) after controlling for relevant demographic, educational and job market characteristics?

3. Other things being equal, does the effect of international status on career outcomes differ by major, Carnegie classification and institutional control?
4. After controlling for demographic, educational and job market characteristics, do countries of origin (International master's recipients from China and India as compared to domestic master's recipients from the U.S.) have a significant impact on international master's recipients' career outcomes as compared to domestic master's recipients?

Data Sources and Sample

An introduction of NSRCG survey. The primary datasets used in this study are combined datasets of National Survey of Recent College Graduates (NSRCG 2001, NSRCG 2003, NSRCG 2006, NSRCG 2008, NSRCG 2010). Administered by the National Science Foundation (NSF) from 1973 through 2010, the NSRCG survey is a cross-sectional biennial survey that provides demographic and career information about individuals holding a bachelor's or master's degree from U.S. academic institutions (NSF, 2013). Specifically, the target population of the NSRCG consists of all individuals with the following characteristics: (1) under the age of 76 as of the survey reference week; (2) living in the United States during the survey reference week; (3) recipients of a bachelor's or master's degree in science, engineering, health, psychology and social science fields from a U.S. institution.

This study uses restricted individual survey data made available through a license with the National Center for Science and Engineering Statistics (NCSES), National Science Foundation (NSF). The NSRCG survey is appropriate for this study for two primary reasons. First, unlike other national surveys focusing only on domestic students, NSRCG survey provides detailed information about visa status, educational background, demographic information and job

market characteristics for international and domestic master's recipients. Prior research studying career outcomes of immigrants has cautioned that visa types are closely associated with immigrants' career outcomes because visa types carry a variety of characteristics related to educational backgrounds and immigration regulations that could significantly shape career outcomes of immigrants in the host country job market (Fogg & Harrington, 2012; Lan, 2013). Thus, the detailed visa types in this survey are particularly important for studying career outcomes of international master's recipients because this visa information helps identify the international master's recipients with only temporary resident visas, which avoids the possible confounding effect of visa types on career outcomes. In addition, the rich information on demographic, educational and job market characteristics is crucial in this study because it provides a comprehensive set of covariates associated with employment outcomes, which can be accounted for in order to have better estimates of the net effect of international status on their career outcomes.

As previous studies have cautioned that failing to account for the sample design effect may lead to biased estimates in hypothesis testing for studies using national represented surveys (O'Donnell, Doorslaer, Wagstaff, & Lindelow, 2007; Thomas & Heck, 2001), it is important to illustrate the detailed sample design of NSRCG. First, a nationally representative sample of around 300 institutions was selected, with the top 85 STEM baccalaureate producers selected with certainty and the remainder selected from all institutions awarding STEM bachelor's degrees, with probability proportional to size. In the second stage, a stratified sample of students who earned STEM baccalaureates from these institutions was selected. Around 18,000 students are surveyed every year. The NSRCG response rates have declined slightly from 1993 to 1997, but were 82% or more in all years surveyed. Following previous studies (Broene & Rust, 2000;

Kim, Saatcioglu & Neufeld, 2012), the command SVY in STATA is used to adjust the two-stage (Probability Proportional to Size) PPS sampling and the stratified sampling using the final survey weight (WTSURVY) in order to effectively control for the sample design effect on hypothesis testing in this analysis.

An introduction of sample selection. This study sample was restricted to international master's recipients defined as non-U.S. citizens holding temporary resident visas and domestic master's recipients defined as domestic U.S. citizens instead of naturalized citizens. In total, the initial number of international and domestic master's recipients extracted from combined NSRCG surveys (2001, 2003, 2006, 2008 and 2010) were 3,378 and 14,753, respectively. Given the relatively low number of international master's recipients in each NSRCG survey (each survey roughly contains around 520 international master's recipients), combining five surveys provided sufficient sample size of international master's recipients for the statistical analysis. In addition, this study sample was further narrowed to full-time workers with an age range of 19 to 65. As defined by NSF (2001), full-time employees are those who work more than 35 hours per week, so following this definition and previous studies (Kim & Sakamoto, 2010; Kim & Zhao, 2014), this study further excluded master's recipients who worked less than 35 hours per week (661 international and 1,864 domestic master's recipients, respectively). Therefore, the number of international master's recipients decreased from 3,378 to 2,717 (n=2,717) and the number of domestic master's recipients dropped from 14,573 to 12,709 (n=12,709). In addition, this study excluded international master's recipients who were older than 65, the total number of international master's recipients decreased from 2,717 to 2,716 cases and the corresponding number for domestic master's recipients dropped from 12,709 to 12,686 cases.

In order to examine the effects of countries of origin on international master's recipients' career outcomes, the top 15 origin countries were selected. This selection is necessary because international master's recipients are heavily concentrated in the top 15 birth countries, which consist of up to 62.48% of all international master's recipients among 185 countries (n=2,764). In order to have enough sample size for examining the effects of countries of origin, this study selected the top 15 countries of origins and excluded other 170 origin countries with a total of 1,037 international master's recipients, which further decreased the international master's recipients to 1,680 (n=1,680). These top 15 countries are India, China, Mexico, Colombia, Taiwan, Germany, Venezuela, South Korea, Canada, Japan, Turkey, Nigeria, Pakistan, Thailand and France. Furthermore, the selection of fields of study, Carnegie classifications and race/ethnicity further limited the number of international and master's recipients. Due to the small sample size in certain categories in Carnegie classification, field of study and race/ethnicity, this study focused on international master's recipients from the top 15 countries (India, China, Mexico, Colombia, Taiwan, Germany, Venezuela, South Korea, Canada, Japan, Turkey, Nigeria, Pakistan, Thailand and France). Then, international master's recipients were restricted to those who received master's degree from five Carnegie classifications (Research I, Research II, Doctoral I, Doctoral II and Comprehensive I Universities) and majored in seven majors (engineering, mathematics and computer science, physical science, chemistry and physics, psychology, social science and health). In terms of racial profile, international master's recipients were restricted to be White, Hispanic, Black and Asian. By using DFBETA in Stata to detect outliers, an earning outlier of \$ 970, 000 (DFEBTA=-1.19) was excluded from the sample. The final sample size for international and master's recipients were 1,664 and 9,940, respectively.

Dependent, Independent and Control Variables

Dependent variables. This study aims to examine employment differences between international and domestic master's recipients in terms of major-job match, annual earnings and the overall job satisfaction.

The first dependent variable is major-job match, which was extracted from variable **OCEDRLP** in the NSRCG dataset. **OCEDRLP** is an ordinal categorical variable that indicates the extent to which college graduates' principal job is related to the highest degree, with 1 being not related, 2 being somewhat related and 3 being closely related. The second dependent variable is annual earnings. This study used variable **SALARY** in the NSRCG dataset, which measures the basic annual salary of college graduates as of the survey reference week. Salary is a continuous variable with a range of 0 to 999996 in the NSRCG dataset. The third dependent variable is overall job satisfaction. Job satisfaction was collected from variable **JOBSATIS** in the NSRCG dataset based on a question about *how you rate your overall satisfaction with the job you held during the survey reference week*. This variable is an ordinal categorical variable that consists of four rates (1=very dissatisfied; 2=somewhat dissatisfied; 3=somewhat satisfied; 4=very satisfied). It is worth noting that in 2001 NSRCG, it did not include the overall job satisfaction variable. Instead, it used nine separate items to measure the rate of satisfaction on nine aspects of one's job (salary, benefits, job security, location, opportunities for advancement, intellectual challenge, level of responsibility, degree of independence and contribution to society). Thus, the overall job satisfaction variable in 2001 NSRCG was generated using the average of these nine satisfaction rates.

Independent variables. This study aims to explore whether international status and country of origin have played unique roles in influencing their career outcomes and whether the

effect of international status on career outcomes differ by field of study and college quality. Therefore, international status, country of origin, major, and measures of college quality are the primary independent variables in this study.

International status (IV). International status is a variable that indicates if one is an international or domestic master's recipient. This variable was extracted from the variable **CTZN**. Based on the definition of international and domestic students in this study, international students are ones who are non-U.S. citizen and holding temporary resident visas, while domestic students are those who are U.S. citizens and were born in the U.S. Thus, international status is a categorical variable with 1 being international master's recipients.

Country of Origin (IV). Country of origin variable was extracted from **BTHST**, which lists the birth states of domestic U.S. master's recipients, as well as countries of international master's recipients. This variable is recoded as U.S and foreign countries where international master's recipients were born.

Field of study (IV). Field of study variable was extracted from **NDGRMED**, which measures the field of study for the master's degree. This study examines the fields where international master's recipients gained their most degrees: engineering, math and computer science, physical, chemistry and physics science, biology and agricultural science, health, psychology and social science. Field of study is used to clarify whether the well documented field of study effect on employment outcomes differ significantly by international/domestic master's recipients.

Institutional Control and selectivity (IV). Following the conventional approach to measure college quality in previous studies (Brewer & Ehrenberg; 1996; Monks, 1999; Kim & Sakamoto, 2010), this study uses Carnegie classifications and institutional control of 1994

Carnegie code to measure college selectivity. Carnegie classification was extracted from variable **HDCARN**, which collects the Carnegie classification of institutions awarding highest degree—master’s degree in this study. The reason of using 1994 Carnegie code is that NSRCG 2001 and 2003 only had the 1994 Carnegie classification and NSRCG 2006, 2008 and 2010 had both the 1994 and 2005 Carnegie classifications. For the sake of consistency of using Carnegie classifications, 1994 code was selected. Besides, since college ranks do not change much over time, using 1994 code should not largely affect the estimates of institutional effect on career outcomes (Morphew & Swanson, 2011). The public/private postsecondary institution was also coded based on values of 1994 Carnegie classifications, with 1 being publicly controlled institutions and 0 being privately controlled institutions.

Control variables. This study also controlled for a variety of variables, including demographic factors, educational background and job market characteristics (see table 1).

Demographic factors (Control variable). Demographic variables, including gender, race/ethnicity, age, marital status, having children and parental education, were controlled as covariates in this study because these factors have been reported to be significantly related to measures of career outcomes.

Extracted from **AGEGR** in NSRCG survey, age was considered as a continuous variable and the age ranging from 19 to 65 was selected in this study. This is the age of master’s recipients when they were surveyed. Gender was extracted from variable **GENDER** and further was recoded as a dummy variable with 1 representing male. Race was collected from **RACETHM** and was recoded into five categories: White, Black, Asian, Hispanic and Native American (Native American categories was excluded in the analysis due to its low sample size). Marital status was extracted from variable **MARIND** in NSRCG and was coded as a dummy

variable with 1 being married. Whether having children was coded as a categorical variable with two categories, with 1 being having at least one child and 0 being not having children. Based on the highest level of education completed by parents or guardians, parental education was further recoded as parents without any college degrees and at least one parent having a bachelor's or higher degrees.

Academic performance (Control variable). Academic performance was measured as the self-reported overall undergraduate grade point average. This variable was collected from the variable UGGPA in the NSRCG dataset, which consists of five categories: 3.75-4, 3.25-3.74, 2.75-3.24, 2.25-2.74, and 1.75 - 2.24. This variable was coded to four dummy variables in the analysis with the 1.75-2.24 as the reference group. It is ideal to examine the GPA for master's programs to study the GPA impacts on international master's recipients' career outcomes, but the NSRCG survey only has information on undergraduate GPA. This study, therefore, used undergraduate GPA to study the GPA effect since undergraduate GPA is likely to be closely associated with graduate academic performance (Kuncel, Crede & Thomas, 2007; McKee Mallory & Campbell, 2001).

Labor market variables (Control variables). A list of labor market variables, such as employer sector, employer size, employer location and being a supervisor were controlled as covariates.

Previous research revealed the wage penalty for college graduates who worked in institutions relative to those working in the industry (Thomas, 2003). Controlling for employer sector is of particular importance in studying international master's recipients. The reason is, despite the average lower wage level for postsecondary institutions, international students may actually prefer positions in the postsecondary institutions in order to avoid the H-1B lotteries,

while those international graduate who select industry and government might have higher likelihood of H-1B being denied during the lottery process (USCIS, 2015). Thus, employer sector variable was coded as two categories: postsecondary institutions, including four-year and two-year institutions and non-postsecondary institutions, including non-profit industry and state/local government.

Previous studies have revealed the significant influence of employer locations on earnings, partially due to the varied economic conditions of the regional labor market and the cost of living differences among regions (Fog & Harrington, 2012, Kim & Sakamoto, 2010; Thomas, 2003). Following previous studies (Fog & Harrington, 2012, Kim & Sakamoto, 2010; Thomas, 2003), employer location was coded as Northeast, Midwest, South and West in order to account for the employer location effect on career outcomes.

Employer size was expected to have a pronounced effect on international master's recipients' career outcomes. Relying on a common explanation that large employers tend to hire higher-quality workers and have more ability to pay high wages, numerous empirical studies found evidence that wages are higher in large firms (Brown & Medoff, 1989; Oi & Idson, 1999; Reilly, 1995). Further evidence shows that a firm's size has a strong effect on IT worker's wage in the U.S. labor market (Levina & Xin, 2007). These findings indicate the particular importance of accounting for firm size in studying international master's recipients' career outcomes, since the majority of international master's recipients work in the IT industry (Government Accountability Office, 2010). Another important reason for controlling for employer size is that due to the complex immigration visa application process for hiring international students, large firms may be more likely to have the human resources to make international hires and more likely to obey the immigration law to give international students comparable salaries (Matloff,

2013). Thus, employer size was collected from **EMSIZE** in the NSRCG dataset and was recoded into a categorical variable with three categories: less than 100 employees, 101 to 1000 employees, 1001 to 25,000 employees.

Prior research has studied the glass ceiling effect in the labor market that racial minorities are less likely to be promoted to be managers as compared to Whites (Kim & Zhao, 2014; Zeng, 2011), thus in order to study the effect of international status on employment outcomes, this glass ceiling effect needs to be accounted for. Supervisor status was collected from NSRCG survey and was recoded as a categorical variable with 1 being supervisors and 0 being non-supervisors.

As prior literature has found that the mismatch between college training and occupations has significant negative effects on monetary and non-monetary career outcomes, such as earnings, job satisfaction, turn-over, and regrets of enrolling (Bender & Heywood, 2011; Kolb, 1990; Kucel & Vilalta-Bufi, 2012; Nordin, Persson & Rooth, 2008; Robst, 2006, 2007; Xu, 2012), major-job match was included as a control variable in the salary and job satisfaction analysis. Furthermore, the positive relationship between income and job satisfaction has been well established and income has been considered as one of the most significant predictors of job satisfaction in previous studies (Judge, Cable, Boudreau, & Bretz, 1995; Kim, Kim, Jaquette & Bastedo, 2014; Liu, Thomas & Zhang, 2010), hence salary was included as a control variable in the job satisfaction analysis in this study. In sum, major-job match (DV) is also considered as a controlled variable in the analysis on earnings, and major-job match (DV) and earnings (DV) are two controlled variables in the analysis on job satisfaction.

In order to capture the effect of graduation timing on career outcomes, this study included a series of dummy variables for each year of the graduation from 1999 to 2009, with 1999 being

the reference year. Previous studies have found evidence that adverse initial labor market conditions can have substantial long-term effects on the earnings of college graduates (Blanchflower & Oswald, 1994; Genda, Kondo, & Ohta 2010; Oreopoulos, Wachter & Heisz, 2012). Using a large longitudinal university-employer-employee dataset, Oreopoulos, Wachter and Heisz (2012) found that the cost of recessions for new graduates is substantial and unequal. Unlucky graduates suffer persistent earnings declines lasting ten years (Oreopoulos, Wachter & Heisz, 2012). In this study, international master’s recipients who graduated in the recession of 2008 and 2009 could have disadvantaged career outcomes as compared to international master’s recipients who graduated before the recession. Therefore, it is necessary to control for the possible effect of graduation year on career outcomes. Table 1 summarizes all the dependent, independent and control variables included in this study.

Table 1. Summaries of Dependent, Independent and Control Variables

Dependent variable	Independent variable	Control variable
Major-job match	International status, country of origin, field of study, Carnegie Classification and institutional control.	Demographic information: age gender, race, marital status, having children and parental education. Educational background: undergraduate GPA and the year Master's degree awarded. Employer characteristics: employer sector, employer size, employer location, being a supervisor and job tenure.
Annual earnings	International status, country of origin, field of study, Carnegie Classification and institutional control.	Demographic information: age gender, race, marital status, having children and parental education. Educational background: undergraduate GPA and the year Master's degree awarded. Employer characteristics: employer sector, employer size, employer location, being a supervisor and job tenure, major-job match.

Job satisfaction	International status, country of origin, field of study, Carnegie Classification and institutional control.	Demographic information: age gender, race, marital status, having children and parental education. Educational background: undergraduate GPA and the year Master's degree awarded. Employer characteristics: employer sector, employer size, employer location, being a supervisor and job tenure, major-job match and annual earnings.
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Statistical Methods: Ordinary Least Squares (OLS), Ordered Logistic Regression, Hierarchical Linear Modeling (HLM) and Hierarchical Generalized Linear Modeling (HGLM)

Since this study focuses on studying the international status effect on three career outcomes, three separate analyses were conducted. For analyses on major-job match, because major-job match is an ordered categorical variable (1 being not related, 2 being somewhat related and 3 being closely related), ordered logistic regression is an appropriate model that allows researchers to explore whether international status can significantly affect the probability of having jobs related to majors after taking into account all other relevant predictors (Hosmer & Lemeshow, 2000). The same ordered logistic regression is applied to job satisfaction analysis because job satisfaction is also an ordered categorical variable (1=very dissatisfied; 2=somewhat dissatisfied; 3=somewhat satisfied; 4= very satisfied). In examining the international status effect on the annual earnings, OLS regression is utilized and the value of the annual earnings is defined as a linear combination of the international status and other demographic, educational and job market variables plus an error term (Pohlman & Leitner,2003).

OLS regression is one of the major statistical techniques used to form the basis model for more advanced analyses and is particularly powerful because it is relatively easy to check the

model assumptions such as linearity, constant variance and outlier effects (Raudenbush & Bryk, 2002). Thus, this study first conducted OLS regression and basic ordered logistic regression to investigate the net effect of international status on major-job match, annual earnings and job satisfaction.

In addition to the basic OLS and ordered logistic regression, this study also further conducted advanced multilevel modeling with the purpose of mitigating the clustering effect to have a more precise estimate of international status effect. In this study, international and domestic master's recipients graduated from 352 institutions with distinct institutional characteristics, such as college selectivity and institutional control, thus the master's recipients and the institutions awarding their degrees form a standard clustering structure. Besides, previous research has found empirical evidence that college graduates' wage is a combined function of individual and institutional characteristics, such as selectivity and institutional control (Thomas, 2000, 2003; Zhang, 2005). If this clustered nature of data is ignored in the statistical analyses, it is likely to mislead the group-level effects and overstate standard errors (Raudenbush & Bryk, 2002; Snijders & Bosker, 1999). Therefore, in order to account for the nested structure of this data (level 2: institutions awarding master's degrees), it is necessary to utilize Hierarchical Linear Modeling (HLM) in the earnings analysis and the Hierarchical Generalized Linear Modeling (HGLM) in the major and job analysis and job satisfaction analysis.

Therefore, one OLS regression and one HLM model on the annual earnings, two ordered logistic regressions and two multilevel models on major-job match and job satisfaction were separately conducted¹. After comparing the results of basic regression models and multilevel

¹ Three unconditional multilevel models were conducted and values of the intraclass correlation coefficient (ICC) were calculated, which were 0.004 for major-job match model, 0.1059 for earnings model and 0.0139 for job satisfaction model.

models, I found that the net effect of international status on three career outcomes did not differ much in these two models. The coefficient of international status on salary is -.0696 and is statistically significant at .05 level in the OLS model compared to -.0697 and being statistically significant at .01 level in the HLM model. The coefficient of international status on major-job match is 2 and is statistically significant at .001 level in the ordered logistic regression model relative to 2.14 and being statistically significant at 0.001 level in the HLM model. The corresponding figures for job satisfaction analysis is 1.12 and 1.04 and both are not statistically significant. Since there has been no significant differences in the net effect of international status on three employment outcomes, for the sake of simplifying the statistical models in this study, I decided to use OLS and ordered logistic regression for the final model.

The basic structure of final model was formally specified as follows. For the OLS model,

$$\text{Logged(EARNINGS)} = \beta_0 + \beta * \text{INTER} + \alpha * \text{DEMO} + \gamma * \text{EDU} \\ + \delta * \text{JOB} + \kappa * \text{MJM} + \sum_{t=2}^{11} \kappa_t \text{YEAR}_{ti} + \mu,$$

Where, β_0 is the intercept, μ is the error term. The equation represents that the logged annual earnings is a function of international status, demographic, educational and job market characteristics plus an error term. Specifically, Logged(EARNINGS) is the logged annual earnings. The reason for using the log transformation is that the annual earnings variables has a high degree of positive skew², thus log transformation can convert this highly skewed variables into a more approximately normally distributed variable(Beaver, Wasserman & Whipp, 1985; Keene, 1995). The vector $\beta * \text{INTER}$ represents the effect of international status on logged

² The skewness of the distribution of annual earnings is 1.19 (a normal distribution would have a skewness of 0), which indicates that the distribution of earnings is highly skewed.

annual earnings. The vector $\alpha * DOME$ indicates the influence of demographic characteristics on logged annual earnings, while the vector $\gamma * EDU$ represents the relationship between logged annual earnings and master's recipients' educational backgrounds, such as major, Carnegie classification, institutional control and undergraduate GPA. The vector $\delta * JOB$ is variables related to master's recipients' labor market characteristics, including employer sector, employer size, supervisor status and employer location. The variable $YEAR$ denotes a vector of graduation year dummy variables with 1999 being the reference group (from 1999 to 2009). $\kappa * MJM$ is the predictor of major-job match and is used as a control variable in earning analyses.

For the ordered logistic regression model used to examine major-job match outcome,

$$\text{Log} \left(\frac{p(y_i \leq m|x)}{p(y_i > m|x)} \right) = \beta_0 + \beta * INTER + \alpha * DOME + \gamma * EDU \\ + \delta * JOB + \sum_{t=2}^{11} \kappa_t YEAR_{ti} \quad (1 \leq m < M),$$

where, $m=2$, $M=3$ since there are three categories in major-job match (1 being not related, 2 being somewhat related and 3 being closely related).

For the ordered logistic regression model to examine job satisfaction outcome,

$$\text{Log} \left(\frac{p(y_i \leq m|x)}{p(y_i > m|x)} \right) = \beta_0 + \beta * INTER + \alpha * DOME + \gamma * EDU \\ + \delta * JOB + \kappa * MJM + \chi * WAGE + \sum_{t=2}^{11} \kappa_t YEAR_{ti} \quad (1 \leq m < M),$$

where, $m=2$, $M=4$ since there are four categories in job satisfaction (1=very dissatisfied; 2=somewhat dissatisfied; 3=somewhat satisfied; 4= very satisfied).

The results of ordered logistic regression were reported in odds ratio (the exponent of the log odds) rather than the log odds because odds ratios are easier to interpret and understand (Long & Freese, 2006). Odds ratios are determined from probabilities and range between 0 and infinity. Odds ratio is defined as the ratio of the probability of success and the probability of

failure. The interpretation would be that for a one unit change in the predictor variable, the odds for cases in a group that is greater than k (k is the level of the dependent variable) versus less than or equal to k are the proportional odds times larger (Bruin, 2006).

Data Analysis Process

This study first tested the common issue in regression models, the issue of multicollinearity and then moved on to discuss the detailed data analysis plan for three analyses based on research questions proposed in this study. Table 2 summarizes the data analyses that were conducted in this study.

First, multicollinearity occurs when multiple independent variables are near perfect linear combinations of one another, and the primary concern of multicollinearity is regression model estimates of the coefficients become unstable and the standard errors for the coefficients can get inflated (Keith, 2006). In order to control for multicollinearity, Stata used the VIF command after the regression to check for multicollinearity and as a rule of thumb, a variable whose VIF value is greater than 10 may merit further investigation (StataCorp, 2013). The VIF analysis found that the highest VIF value in the analysis on annual earnings was 9.1 for health major (agricultural and biology science being the reference group) and the lowest VIF value was 1.03 for supervisor status. Thus, VIF test indicates that the annual earnings analysis did not suffer from multicollinearity. Similarly, the highest and lowest VIF for major-job match model were 3.86 for engineering major and 1.05 for being a supervisor, and for job satisfaction model, they were 3.27 for social science major and 1.05 for public university. Thus, the VIF tests indicated that all three models in the present study did not suffer from multicollinearity.

Table 2. A Summary of Data Analysis by Research Questions

Research Question	Analyses on major-job match	Analyses on annual earnings	Analyses on job satisfaction
1. What are the descriptive characteristics of demographic, educational and job market factors for international and domestic master's recipients?	Percentage distribution, t tests on continuous variables and Chi-square tests on categorical variables	Percentage distribution, t tests on continuous variables and Chi-square tests on categorical variables	Percentage distribution, t tests on continuous variables and Chi-square tests on categorical variables
2. Does international status play a unique role in determining their job market outcomes?	Model 1: Ordered logistic regression on demographic, educational and job market factors	Model 1: OLS regression on demographic, educational and job market factors (major-job match was included as a controlled variable).	Model 1: Ordered logistic regression on demographic, educational and job market factors (major-job match and annual earnings were included as controlled variables).
3. Does the effect of international status on career outcomes differ significantly by major, Carnegie classifications and institutional control?	Model 2-1: Seven separate ordered logistic regression analyses by major on the same variables as Model 1 except for major.	Model 2-1: Seven separate OLS analyses by major on the same variables as model 1 except for major.	Model 2-1: Seven separate ordered logistic regression analyses by major on the same variables as Model 1 above except for major.
	Model 2-2: five separate ordered logistic regression analyses by Carnegie classification on the same variables as Model 1 above except for Carnegie classification.	Model 2-2: five separate OLS regression analyses by Carnegie classification on the same variables as model 1 except for Carnegie classification.	Model 2-2: five separate ordered logistic regression analyses by Carnegie classification on the same variables as Model 1 except for Carnegie classification.

	Model 2-3: Two separate ordered logistic regression analyses by institutional control on the same variables as Model 1 except for institutional control.	Model 2-3: two OLS regression analyses by institutional control on the same variables as model 1 except for institutional control.	Model 2-3: Two separate ordered logistic regression analyses by institutional control on the same variables as Model 1 except for institutional control.
4. Do countries of origin have a significant impact on international master's recipients' career outcomes as compared to domestic master's recipients?	Model 3: The same Order logistic regression in Model 1, except that the international status variable in Model 1 was replaced by two dummy variables of IMR from only India and China, with DMR being the reference group.	Model 3: The same OLS in Model 1, except that the international status variable in Model 1 was replaced by two dummy variables of IMR from only India and China, with DMR being the reference group.	Model 3: The same Order logistic regression in Model 1, except that the international status variable in Model 1 was replaced by two dummy variables of IMR from only India and China, with DMR being the reference group.

For descriptive analyses, I first listed the percentages of categorical variables and mean and standard deviation of continuous variables. Further, I conducted t-tests and Chi-square tests to examine if three career outcomes, demographic, educational background and job market factors differ significantly by international status.

Since a basic regression model was selected for this study, I estimated a list of OLS regression models and ordered logistic regression models. For analyses on major-job match, model 1 was an ordered logistic regression model on demographic, educational and job market factors to test if international status has a significant impact on international master's recipients' major-job match. Then, in Model 2, I estimated separate ordered logistic regression models by field of study (seven models), Carnegie classification (five models) and institutional control (two models) to examine the extent to which the international status effect on major-job match differ by field of study and college quality. The benefits of using subgroup analysis is that it can be used to address to what extent the studied effect disperses across many different types of sample members as opposed to being concentrated within a homogeneous subgroup (Bloom & Michalopoulos, 2010). One objective of this study is to explore the extent to which the effect of international status on career outcomes differs by field of study and college quality, thus it is appropriate to use subgroup analysis instead of probing interaction in model 1. Model 3 was estimated to study the country of origin effect on career outcomes. In Model 3, international status variable was replaced by two dummy variables for countries of origin (India and China), with domestic master's recipients as the reference group. The other 13 countries of origin were excluded in Model 3 because each country contained less than 70 international master's recipients, which were insufficient for meaningful statistical analyses. Thus, in Model 3 only, the sample size of international master's recipients decreased from 1,664 to 1,236. Analyses on

annual earnings and job satisfaction followed the same statistical models as used in analyses on major-job match except for the difference that analyses on earnings used OLS models instead of ordered logistic regressions.

In Model 1 of three analyses on major-job match, earnings and job satisfaction, I built up the regression model by using stepwise regression strategy. Stepwise methods are widely used in educational and psychological research to evaluate the order of importance of variables and to select useful subsets of variables (Lewis, 2007). The purpose of using stepwise regression strategy is to examine how the effect of international status on studied career outcomes changes with additional subsets of variables added to the model. Model 1 was built up using the same four steps in analyses on major-job match, earnings and job satisfaction. Step one included international status variable only in the regression, which indicated the difference in career outcomes between international and domestic master's recipients without any other influences. Step two controlled for the demographic variables, including age, gender, race, marital status, having children and first-generation college students. Step three added educational background factors, including field of study, Carnegie classifications, GPA and year Master's degree awarded. Step four further controlled for the effect of job market factors, including employer sector, job tenure, employer size, employer location and being supervisors.³

Limitations

This study has several limitations that should be illustrated in detail. First, because the data examined in this study is cross-sectional, it only captures the career outcomes of international master's recipients in the early stage of their careers. In order to have a better

³ In analyses on earnings, step four had one additional variable—major-job match. In analyses on job satisfaction, step four had two additional variables—major-job match and annual earnings.

understanding of the career trajectory of international masters' recipients, longitudinal datasets are needed for future research. With the longitudinal data, researchers can examine the career differences between international and domestic master's recipients at different stages of their careers in the U.S. job market.

In addition, previous studies have found that language skills are closely associated with career outcomes of immigrants in the host country, indicating a general positive relationship between host country language proficiency and career success (Frank, 2013; Robertson, Hoare & Harwood, 2011). However, NSRCG did not carry a variable that can precisely measure the language skill of international master's recipients. Therefore, estimates of international status on career outcomes of international master's recipients are likely to be incomplete without completely controlling for the language effect. With that being said, by including countries of origin in the analysis, this study can still capture if foreign culture and language make a significant difference in the career outcomes of international master's recipients because countries of origin to some extent reflect both culture and language differences.

The third limitation is that NSRCG data only measured undergraduate GPA and did not measure graduate GPA, so there is no graduate GPA for master's recipients in this study and thereby undergraduate GPA was examined for master's recipients. Given that studies also showed that undergraduate GPA is not the strongest predictor of graduate performance (McKee, Mallory & Campbell, 2001), using undergraduate GPA for master's recipients might not be able to fully capture the effect of college academic performance on career outcomes.

The fourth limitation is that since this study restricted international masters' recipients to those who hold full-time jobs, findings of this study thereby could not reflect the early career outcomes landscapes of all international master's recipients, including both full-time and part-

time workers. Thus, findings of this study are likely biased because they may not apply to part-time international master's recipients.

The fifth limitation of this study is that this study used parental education (if at least one parent had a college degree) to control for the effect of socioeconomic status effect on career outcomes of international and domestic master's recipients. This approach, however, may have its limitation in sufficiently controlling for the socioeconomic status effect on employment outcomes. As suggested by previous studies, an effective measure of socioeconomic status should include three indicators: income, parental education and measures of household structure (Entwisle & Astone, 1994; Grundy & Holt, 2001). Given that NSRCG did not carry family income variables and only had one family structure variable (the number of children master's recipients had), it is important to acknowledge the limitation of using parental education only to measure socioeconomic status in this study.

Another limitation of this study is to use Carnegie classification and institutional control to measure the institutional quality of master's institutions. As cautioned by Zhang (2005), "any single measure of college quality is not capable of capturing the complexity of higher education institutions; thus, any conclusion based on a particular measure of college quality may be misleading" (Zhang, 2005, p.572). In the case of measuring college quality of institutions at the master's level, it is even more difficult because most studies measuring college quality on employment outcomes focused on institutions at the bachelor's level. Thus, although Carnegie classification was conventionally used to measure college quality or selectivity (Monks, 1999; Kim & Sakamoto, 2010), it is obvious that Carnegie classification is limited in measuring the college quality or selectivity as the creation of Carnegie classification was not intended to measure college selectivity (McCormick & Zhao, 2005).

Another question related to college quality is that the phrase of “college quality” used in this study. It sounds ambiguous to use “college quality” or “high-quality colleges” in this study because it is debatable regarding whether college quality of master’s institutions is measurable and how to measure the college quality or selectivity of master’s institutions. Despite the clear limitation of Carnegie classifications in measuring college quality, the perception of college quality has always been one of the most important factors that influence the decision of selecting institutions for international students and their parents (Mazzarol & Soutar, 2002). Therefore, while acknowledging the limitation of using Carnegie classification and the ambiguous nature of “college quality”, I decided to use college quality in this study because of the importance of perceived college quality for international students in the stage of college selection process. It is hoped that based on this study, further study can pay more attention to studying the career outcomes of international master’s recipients and measuring college quality of master’s institutions in a more precise and effective way.

The last limitation of this study is that findings of this study may only reflect the career outcomes of those international master’s recipients who intended to stay and work in the U.S. and were selected by the U.S. job market. International master’s recipients faced choices of staying in the U.S. or going back to their home countries after they graduated. Among international master’s recipients who intended to stay, only those who were considered as valuable contributors to the U.S. economy were employed by the U.S. employers. Therefore, findings of this study are limited in depicting the career outcomes of international master’s recipients as a population.

Chapter 5: Results

In this chapter, results of data analyses are presented to answer four research questions proposed previously. Descriptive analyses on demographic, educational and job market factors of international and domestic master's recipients were conducted to answer the first research question of what are the demographic, educational, and job market statuses of international and domestic master's recipients. Results of three analyses are presented in this chapter. Each analysis included three models: the first model was the basic regression model to answer the second research question of whether international status has a significant impact on major-job match, annual earnings, and job satisfaction (Model 1); the second model was subgroup analysis by major, Carnegie classification and institutional control in order to answer the third research question of how the international status effect on employment outcomes differs by major and college quality (Model 2); and the third model compared the career outcomes of international master's recipients from India and China with domestic master's recipients to answer the fourth research question of whether country of origin has a significant influence on employment outcomes of international master's recipients (Model 3).⁴

What Are the Demographic, Educational and Job Market Characteristics of International and Domestic Master's Recipients?

As Table 3 shows, the sample examined in this research includes 11,604 master's recipients who graduated from the U.S. institutions from 2000 to 2009 and worked full-time (35 hours or more per week) in the U.S. IMR are defined as those who were born in the non-U.S.

⁴ As illustrated in chapter 4, the other 13 countries of origin were excluded in country of origin analysis because each country contained less than 70 samples, which could not be sufficient for meaningful statistical analyses. Thus, only international master's recipients from India and China were included in model 3 analysis.

countries and hold temporary H-1B working visas (n=1,664). DMR are referred as those who are domestic U.S. citizens (n=9,940). Of master's recipients included in this research, IMR make up 14.34% of the sample, whereas the DMR consist of 85.66% of the sample. IMR were from 15 foreign countries, including India, China, Mexico, Colombia, Taiwan, Germany, Venezuela, South Korea, Canada, Japan, Turkey, Nigeria, Pakistan, Thailand and France. The majority of IMR is from India (49.94%) and China (20.78%); the other 13 countries only contribute 19.28% of the international master's recipients.

Table 3. Descriptive Statistics on Sample Size of DMR, IMR and Distribution of Birth Country (N=11,604)

Country	Frequency	Percentage
Domestic Master's recipients(DMR)	9,940	85.66%
International Master's recipients(IMR)	1,664	14.34%
Total	11,604	100.00%
Birth Country For IMR		
India	875	52.58%
China	361	21.69%
Colombia	70	4.21%
Mexico	66	3.97%
Taiwan	60	3.61%
Venezuela	32	1.92%
South Korea	29	1.74%
Turkey	28	1.68%
Nigeria	25	1.50%
Canada	24	1.44%
Japan	23	1.38%
Pakistan	21	1.26%
Thailand	18	1.08%
France	15	0.90%
Germany	14	0.90%
Total	1,664	100.00%

Descriptive analyses on employment outcomes. The descriptive analyses on three employment outcomes in Table 4 and Table 5 show different patterns between IMR and DMR with respect to salary, major-job match, and job satisfaction.

A Chi-square test on major-job match indicated that international and domestic master's recipients differed significantly in major-job match ($\chi^2=125.74$, $p=0.0001$). First, IMR are more likely than DMR to be employed in jobs that are closely related to their majors, because 77.16% of IMR reported that their jobs are closely related to their majors, whereas the corresponding figure for DMR is only 64.09%. Then, this similar pattern stands in the category of jobs that are not related to their majors. There are 3.19% of IMR who believed that their jobs were not related to their college majors relative to 9.11% of DMR. Furthermore, only 19.65% of IMR report their jobs are somewhat related to their majors, while the corresponding figure for DMR is up to 26.79%.

T-tests on annual earnings suggested that after adjusting for inflation, international master's recipients on average had significantly higher annual earnings than domestic master's recipients ($t(11604)=2.28$, $p<.5$). With regard to annual earnings, IMR generally have higher annual earnings than DMR. The average annual earnings for IMR is \$57,171, which is \$760 higher than the mean earnings for DMR (\$56,408). After controlling for inflation, IMR still have a salary advantage as compared to their DMR peers. In specific, the average annual earnings for IMR (\$62,176) is \$1,635 higher than DMR (\$60,541) after accounting for the inflation influence.

A Chi-square test on job satisfaction indicated that international and domestic master's recipients differed significantly in job satisfaction ($\chi^2=37.45$, $p=0.0001$). As for the overall job satisfaction, IMR seem to be more satisfied and less dissatisfied with their jobs relative to DMR. To further illustrate, IMR (44.95%) slightly differ from DMR (45.14%) in rating the job

satisfaction as “very satisfied,” but 46.63% of IMR are “somewhat satisfied” with their jobs as compared to 41.63% of DMR. Regarding dissatisfaction with jobs, about 6.79% and 1.62% of IMR are somewhat dissatisfied or very dissatisfied with their jobs respectively, whereas the corresponding figures for DMR are 9.68% and 3.55, respectively.

Table 4. Sample Descriptive Statistics Using t-test for Annual Earnings

	IMR		DMR		t-test
	M	SD	M	SD	
Annual earnings (before adjusting for inflation)	\$57,171	229,14	\$56,408	25,866	ns
Annual earnings (after adjusting for inflation)	\$62,176	25,103	\$60,541	27,289	2.28*

Note. *p<.05, **p<.01, ***p<.001. M=Mean. SD=Standard Deviation.

Table 5. Sample Descriptive Statistics Using Chi-square on Major-job match and Job Satisfaction

		IMR	DMR	Chi-Square	P
Major-job match	Not related	3.19%	9.11%	125.74***	0.0001
	Somewhat related	19.65%	26.79%		
	Closely related	77.16%	64.09%		
Overall job satisfaction	Very dissatisfied	1.62%	3.55%	37.45***	0.0001
	Somewhat dissatisfied	6.79%	9.68%		
	Somewhat satisfied	46.63%	41.63%		
	Very satisfied	44.95%	45.14%		

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

Descriptive analyses on demographic characteristics. As illustrated in Table 6, international master’s recipients demonstrate different distribution patterns as compared to domestic master’s recipients in demographic characteristics, including gender, age, marital status, having children and race/ethnicity. First, the majority of the graduates in IMR are males (67.4%, relative to 32.5% female). However, female graduates make up 53.38% of DMR, which is 7% more than the proportion of male master’s recipients (46.62%). In addition, IMR and DMR differed significantly in age when they were surveyed (Table 7). IMR are about three years

younger than DMR with the average age for IMR being 28.51 years old as compared to 31.42 for DMR.

In terms of marital status, IMR are slightly less likely to be married than DMR. Specifically, 47.26% of DMR were married, while this corresponding figure for IMR is 43.99%. Another notable difference between IMR and DMR is that IMR are less likely to have children in the early stage of their careers as compared to their domestic peers. Specifically, DMR (25.54%) are two times more likely than IMR (11.48%) to have children. As for the socioeconomic status as measured by parental education, IMR are more likely (88.52%) than DMR (61.40%) to come from families with parents holding college degrees.

Furthermore, international master’s recipients differ greatly from domestic master’s recipients in racial/ethnic composition. The largest proportion of international master’s recipients is Asian (83.17%), followed by Hispanic (10.46%), White (4.87%) and Black (1.5%), whereas the majority of domestic master’s recipients are White (65.23%), followed by Hispanic (16.39%), Black (15%) and Asian (3.38%).

Table 6. Sample Descriptive Statistics Using Chi-square tests for Categorical Independent Variables

		IMR	DMR	Chi-square	P
<i>Demographic characteristics</i>					
Gender	Male	67.43%	46.62%	246.88***	0.0001
	Female	32.57%	53.38%		
Marital status	Married	43.99%	47.26%	6.137*	0.013
	Not-married	56.01%	52.74%		
Having Children	Yes	11.48%	25.54%	156.72***	0.0001
	No child	88.52%	74.46%		
First generation	College degree	78.05%	61.40%	169.19***	0.0001
	less than college degree	21.95%	38.60%		
Race	White	4.87%	65.23%		
	Asian	83.17%	3.38%		
	Hispanic	10.46%	16.39%		

<i>Educational background</i>	Black	1.50%	15%	730***	0.0001
Major	Biology & Agriculture	4.21%	8.89%		
	Math & Computer science	25.24%	70.85%		
	Physics & Chemistry Science	7.33%	7.01%		
	Engineering	57.21%	37.17%		
	Health	0.72%	8.76%		
	Social science	4.69%	16.80%		
	Psychology	0.60%	11.09%	861.90***	0.0001
Carnegie classification	Research I	49.55%	45.36%		
	Research II	13.05%	11.28%		
	Doctoral I	10.16%	6.88%		
	Doctoral II	8.48%	9.54%		
	Comprehensive I	18.76%	26.95%	68.86***	0.0001
Institutional control	Publically controlled	72.54%	68.31%		
	privately controlled	27.46%	31.69%		
GPA	3.75-4	36.25%	24.59%		
	3.25-3.74	47.07%	41.65%		
	less than 3.24	16.69%	33.76%	11.88**	0.001
Year Master's Degree Awarded	1999	8.89%	6.50%		
	2000	10.40%	7.48%		
	2001	7.33%	7.32%		
	2002	4.69%	6.50%		
	2003	5.47%	7.10%		
	2004	7.63%	7.65%		
	2005	16.11%	9.11%		
	2006	11.54%	11.74%		
	2007	10.94%	12.53%		
	2008	10.10%	11.60%		
	2009	12.56	12.46%	48.85***	0.0001
<i>Job market characteristics</i>					
Employer sector	Education institutions	20.01%	24.56%		
	Government and industry	79.99%	75.44%	16.18***	0.0001
Employer size	<100	22.42%	17.43%		
	100-1000	19.35%	20.25%		
	1000-250000	45.37%	41.56%		

	>25000	12.86%	20.75%	70.24***	0.0001
Employer locations	Northeast	23.10%	17.91%		
	Midwest	17.63%	18.38%		
	South	32.37%	38.40%		
	West	26.90%	25.32%	35.54***	0.0001
Supervisor status	Yes	20.31%	31.18%		
	No	9.69%	68.82%	80.71***	0.0001

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

Descriptive analyses on educational backgrounds. Chi-square tests indicated that the distribution of field of study, Carnegie classifications, institutional control and GPA differed significantly for international versus domestic master's recipients. With regard to field of study, IMR are highly concentrated in the STEM fields, while DMR are distributed relatively evenly in STEM and non-STEM fields. Specifically, around 94% of IMR majored in STEM fields, while only about 64% of DMR majored in STEM fields. Only 4.69% of IMR majored in social science, whereas this corresponding figure for DMR is 16.8%. Less than 0.72% and 0.60% of IMR majored in health and psychology respectively, whereas the corresponding figures for DMR are 8.76% and 11.09% respectively.

In addition, IMR were more likely than DMR to graduate with degrees from high status institutions as measured by Carnegie classification. In particular, IMR (49.55%) are 4.19% more likely than DMR to graduate from research I universities (45.36%), are 2.77% more likely than DMR to receive degrees from research II institutions (13.05% vs. 11.28%), and are 3.28% more likely to graduate from doctoral I institutions (10.61% vs. 6.88%). On the other hand, IMR are 1.06% less likely than DMR to gain degrees from Doctoral II institutions (8.48% vs. 9.54%), and are 8.19% less likely than DMR to graduate from Comprehensive I institutions (18.76% vs. 26.95%). In terms of institutional control, the majority of IMR and DMR graduated from publically controlled institutions, but IMR are 3.23% more likely than DMR to graduate from public institutions (72.54% vs. 68.31%) and are 4.23% less likely to receive degrees from private

institutions (27.46% vs. 31.69%). In addition, the difference between IMR and DMR in their undergraduate GPA is evident in that IMR are more likely to have high GPA than DMR. Over 83% of IMR held GPAs higher than 3.25, while this corresponding figure for DMR is around 65%; the proportion of IMR with GPA less than 3.24 is 16.69%, but DMR in the same category of GPA is two times for percentage (up to 33.76%).

Descriptive analyses on job market characteristics. Chi-square tests showed major differences between international and domestic master's recipients on employment sector, employer size, job tenure, employer location and being supervisors. First, IMR differed significantly in job tenure ($t(11604) = 10, p < .001$). In particular, as shown in Table 7, the average length of time for IMR working on the current jobs is 1.79, which is 0.83 year less than that of DMR (2.62 years). A sizeable difference lies in that IMR are more likely to work in industry and government instead of educational institutions. IMR are 4.55% more likely to work in industry and government relative to their DMR peers (79.99% vs. 75.44%), while IMR are 4.55% less likely than DMR to work in educational institutions (20.01% vs. 24.56%). Regarding employer size, IMR are 7.89% less likely than DMR to work for employers with more than 25,000 employees (12.86% vs. 20.75%), and are 4.99% more likely than DMR to work for employers with less than 100 employees (22.42% vs. 17.43%). However, IMR are 3.81% more likely than DMR to work for employers with employees ranging from 1001 to 25,000. IMR do not differ significantly from DMR in working for employers with 101 to 1000 employees (19.35% vs. 20.25%). Furthermore, employer locations somewhat vary between IMR and DMR. IMR are 5.09% more likely than DMR to work in Northeast (23.1% vs. 17.91%) and are 6.03% less likely than DMR to work in South (32.37% vs. 38.40%). Other than that, percentages of IMR and DMR working in the West (26.90% vs. 25.32%) and Midwest (17.63% vs. 18.38%) are

similar. As for the supervisor status, IMR are 9.87% less likely than DMR to be supervisors (20.31% vs. 31.18%).

Table 7. Sample Descriptive Statistics Using t-test for Job Tenure and Age

	IMR		DMR		t-test
	M	SD	M	SD	
Job tenure	1.79	1.33	2.62	3.36	10***
Age	28.51	3.8	31.42	7.38	15.68***

Note. *p<.05, **p<.01, ***p<.001. M=Mean. SD=Standard Deviation.

Analyses on Major-job Match

To determine the effect of international status on major-job match, I ran an ordered logistic regression model on demographic, educational and job market factors to answer the research question of whether international status plays a unique role in determining major-job match (Model 1). In Model 2, I did subgroup analysis by running seven separate ordered logistic regression models by major, five separate ordered logistic regression models by Carnegie classification and two separate ordered logistic regression models by institutional control to answer how the effect of international status on major-job match differs by major, Carnegie classification and institutional control (Model 2). In model 3, by comparing the career outcomes of international master’s recipients from India and China with domestic master’s recipients, I sought to answer the question of whether country of origin has a significant effect on major-job match (Model 3).

Model 1. Does international status have a significant effect on major-job match? As shown in Table 8, the base model (step 1) with only the IMR (DMR being the reference group) in the analysis indicated, that before controlling for any other variables, the odds of holding jobs that are related to their majors are 51% higher for international master’s recipients than their domestic counterparts (odds ratio=1.51, p<0.001). In step 2, after controlling for demographic

variables, such as age, gender, marital status, family socioeconomic status, having children, and race/ethnicity, the coefficient of being IMR increased from 1.51 to 1.83 and it is statistically significant at the .001 level. Step 2 indicated that after controlling for demographic characteristics, the likelihood of having jobs that are related to master's field of study is 83% higher for IMR relative to DMR (odds ratio=1.83, $p<0.001$).

Table 8. Estimated Effects of Being International Master's Recipients on Major-job Match

Variables		Step 1	Step 2	Step 3	Step 4
IMR (DMR is the reference group)	Coefficient	1.51***	1.83***	1.93***	2.002***
	P-value	-0.1381	-0.2596	-0.2722	-0.2836
Pseudo R Square		0.0066	0.0106	0.0345	0.0459

Note. Step 1 only included international status in the analysis; step 2 included international status and demographic factors. In step 3, educational background factors were added to the analysis. In step 4, job market characteristics were added to the analysis.

And then, step 3 moved on to control for both demographic factors and educational experiences, including field of study, institutional control, Carnegie classification and undergraduate GPA. Results in step 3 indicated that after taking into account master's recipients' demographic characteristics and educational experiences, the coefficient of being IMR increased from 1.83 to 1.93 and was still statistically significant at the .001 level. Step 3 revealed that the odds of having jobs that are more related to field of study are 93% higher for IMR than DMR (odds ratio=1.93, $p<0.001$). By adding a series of job market characteristics into the final model (step 4), the coefficient of being IMR increased from 1.93 to 2.00 and remained statistically significant at the .001 level. Step 4 revealed that after controlling for demographic, educational and job market characteristics, international master's recipients are two times more likely than domestic master's recipients to hold jobs that are related to their master's degree (odds

ratio=2.00, $p<0.001$). As for how demographic, educational and job market characteristics influence the major-job match, findings are presented in Appendix 1.

Model 2. How does the effect of international status on major-job match differ by field of study, Carnegie classification and institutional control? The analysis reported in this section examined to what extent the effect of international status on major-job match differs by field of study, Carnegie classification and institutional control.

Separate Ordered Regression Analyses by field of study. As shown in Table 9, the estimated effects of being IMR on major-job match differ by field of study. Generally speaking, all things being equal, international master's recipients with Mathematics and Computer science, Engineering and Social science majors have jobs that are more related to their majors than IMR with Biological and Agricultural Science, Psychology, Health, and Physical Science, Chemistry and Physics relative to DMR with the corresponding majors. In particular, IMR who majored in Mathematics and Computer science are 3.13 times more likely than DMR to have jobs more related to their majors (odds ratio=3.13, $p<0.01$); the jobs of IMR who majored in Social science are 2.43 times more related to their master's majors than jobs of DMR with the same major (odds ratio=2.43, $p<0.01$); the likelihood of getting jobs that are related to their master's majors are 2.36 times higher for IMR with Engineering majors than their DMR peers with engineering major (odds ratio=2.36, $p<0.01$). On the other hand, after controlling for relevant demographic, educational and job market characteristics, IMR and DMR do not demonstrate significant differences in major-job match within majors including Biological and Agricultural Science, Psychology, Health and Physical Science, Chemistry and Physics. Furthermore, it is worth noting that IMR who majored in Health and Psychology actually are 35% and 16% respectively less likely to have jobs associated with their majors as compared to their DMR peers, although

these differences are not statistically significant (odds ratio=0.65, $p>.05$ for graduates majored in Health; odds ratio=0.84, $p>.05$ for graduates majored in Psychology).

Regression models by Carnegie classification and institutional control. International master's recipients who graduated from Doctoral I, Comprehensive I and Research I institutions perform better in the job market in terms of major-job match than IMR who gained degrees from Research II and Doctoral II institutions relative to their DMR counterparts. To further illustrate, after controlling for relevant demographic, educational and job market characteristics, IMR who graduated from doctoral I institutions are 8.42 times more likely to have jobs related to their majors than DMR from the same institutions (odds ratio=8.42, $p<0.001$); the odds of having jobs related to their majors are 1.79 times higher for IMR from Research I institutions and 1.85 times higher for IMR from Comprehensive I than DMR from the corresponding institutions (odds ratio=1.79, $p<.01$ for Research I institutions; odds ratio=1.85, $p<.05$ for Comprehensive I institutions). On the other hand, all things being equal, there are no statistically significant differences in major-job match between IMR and DMR who graduated from either Research II or Doctoral II institutions (odds ratio=1.16, $p>.05$ for Research II institutions; odds ratio=0.90, $p>.05$ for Doctoral II institutions). Further, being IMR actually has a negative effect on major-job match for IMR who graduated from Doctoral II institutions as compared to their DMR counterparts, although this negative effect is not statistically significant (odds ratio=0.90, $p>.05$). In terms of the net effect of being IMR on major-job match by institutional control, the likelihood of having jobs related to their master's majors is slightly higher for IMR who graduated from public institutions than IMR from private institutions as compared to their DMR counterparts. In particular, after controlling for relevant demographic, educational and job market characteristics, the odds of having jobs related to their majors are 2.15 times higher for

IMR who graduate from public institutions than their DMR peers (odds ratio=2.15, $p<.001$), and the corresponding odds ratio for IMR who graduated from private institutions relative to their DMR peers is 1.78 (odds ratio=1.78, $p<.001$).

Table 9. Estimated Effects of Being International Master's Recipients on Major-job Match by Field of Study, Carnegie Classification and Institutional Control

Category of Field of Study							
	Biology & Agricultural Science	Mathematics & Computer science	Physical, Chemistry & Physics	Psychology	Social science	Engineering	Health
IMR†	1.29	3.13**	1.7	0.8475	2.43**	2.36***	0.6585
S.E.	0.5933	1.27	0.7948	0.8223	0.7886	0.4062	0.6164
N	925	1,371	795	1,080	1,701	4,548	826
Carnegie Classifications							
	Research I	Research II	Doctoral I	Doctoral II	Comprehensive I		
IMR†	1.79**	1.16	8.42***	0.9072	1.85*		
S.E.	0.3007	0.4218	4.14	0.3498	0.4898		
N	5,192	1,295	820	1,048	2,891		
Public/private Universities							
	Public	Private					
IMR†	2.15***	1.78**					
S.E.	0.3945	0.3841					
N	7,819	3,427					

Note. †DMR is the reference group; * $p<.05$, ** $p<.01$, *** $p<.001$ (two-tailed tests).

Model 3. Does country of origin have a significant impact on major-job match? As shown in Table 10, after controlling for demographic, educational and job market factors, Chinese international master's recipients seem to be more likely to find jobs related to their majors than Indian international master's recipients as compared to domestic master's recipients. Specifically, all things equal, IMR from China are 2.81 times more likely to find jobs related to their major than DMR from America (odds ratio=2.81, $p<.001$). IMR from India are 1.76 times more likely to have jobs relate to their majors than DMR (odds ratio=1.76, $p<.01$).

Table 10. Estimated Country of Origin Effects on Major-Job Match

Country of Birth	Odds Ratio	S.E.
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China	2.81***	0.6941
India	1.76**	0.2963

Note. *p<.05, **p<.01, *** p<.001(two-tailed tests).

Analyses on Annual Earnings

In order to examine the effect of international status on annual earnings, I ran an OLS regression on demographic, educational and job market factors to answer the research question of whether international status plays a unique role in determining earnings (Model 1). In Model 2, I did subgroup analysis by running seven separate OLS models by major, five separate OLS models by Carnegie classification and two separate OLS models by institutional control to answer how the effect of international status on annual earnings differs by major, Carnegie classification and institutional control (Model 2). In model 3, by comparing the career outcomes of international master’s recipients from India and China with domestic master’s recipients, this analysis was to answer whether country of origin has a significant effect on earnings (Model 3).

Model 1. Does international status have a significant effect on annual earnings? As shown in Table 11, the base model (step 1) with IMR alone (DMR being the reference group) in the analysis indicated that before controlling for any other relevant variables, the annual earnings for IMR is 6.65% higher than the annual earning for DMR and this difference is statistically significant at the 0.001 level. After adding demographic factors in step 2, the coefficient of being IMR became $-.0192$, but this coefficient was not statistically significant, which suggested that after controlling for demographic factors, international and domestic master’s recipients did not differ significantly in earnings and the significant difference in earnings in step 1 can be explained by demographic factors. After controlling for both demographic and educational background factors in Step 3, the difference in earnings became statistically significant and international master’s recipients had a 7.11% loss in earnings as compared to domestic master’s

recipients. After accounting for demographic, educational and job market factors in step 4, the earning gap between international and domestic master’s recipients became slightly smaller, from $-.0711$ to $-.0606$. Specifically, after controlling for relevant demographic, educational background and job market characteristics, international master’s recipients who work in the American job market for less than three years face a 6.06% earning disadvantage as compared to their domestic master’s recipients and this difference is statistically significant at the .05 level. As for how demographic, educational and job market characteristics influence annual earnings, findings are presented in Appendix 2.

Table 11. Estimated Effects of Being International Master's Recipients on Log Annual Earnings

Variables		Step 1	Step 2	Step 3	Step 4
IMR	Coefficient	.0665**	-0.0192	-.0711**	-.0606*
	P-value	-0.0238	-0.0244	-0.0229	-0.0272
Adjusted R Square		0.0022	0.056	0.1739	0.2636

Note. Step 1 only included international status in the analysis; step 2 included international status and demographic factors. In step 3, educational background factors were added to the analysis. In step 4, job market characteristics were added to the analysis (major-job match was included in step 4 as a job market factor).

Model 2. How does international status effect on earnings differ by field of study, Carnegie classification and institutional control? Table 12 presents the coefficients of being IMR on the logged annual earnings, sample size of international and domestic master’s recipients, and adjusted R-square in all subgroup analyses.

Subgroup analysis by field of study. Table 12 shows that after holding constant relevant demographic, educational and job market characteristics, IMR who majored in Engineering suffer a significant annual earnings loss relative to their DMR peers with the same Engineering peers, whereas IMR who majored in other six fields (Biological and Agricultural Science,

Mathematics and Computer science, Physical, Chemistry and Physics, Psychology, Social science, and Health) actually do not experience significant differences in annual earnings as compared to their DMR counterparts with the same majors. Specifically, after controlling for relevant demographic, educational and job market characteristics, the annual earnings of IMR who hold degrees from Engineering field are 12.24% lower than the annual earnings of DMR with the same engineering degrees, and this difference is statistically significant at the .001 level. On the other hand, IMR with other majors other than Engineering do not face significant annual earnings loss as compared to their DMR peers with the same majors. To further illustrate, being IMR has negative effects on earnings among master's recipients with biology and agricultural science, physical, chemistry and physics, psychology and health; but none of these differences is statistically significant. Among master's recipients with such majors as social science and mathematics and computer science, being IMR has a positive effect on the logged annual earnings, but those differences are not statistically significant either.

Regression models by Carnegie classification and institutional control. The net effect of being IMR on logged earnings, as shown in Table 12, is not fixed across Carnegie classifications. Instead, IMR who gained degrees from Research II institutions face a significant earnings loss as compared to their DMR peers from the same institutions, but those IMR who graduated from Research I, Doctoral I and Doctoral II and Comprehensive I do not have significant differences in the annual earnings as compared to their DMR counterparts from the corresponding institutions. Holding constant the relevant demographic, educational and job market characteristics, IMR who graduate from Research II institutions suffer a 14.15% earning loss as compared to their DMR counterparts from the same institutions. Yet the annual earnings of those

IMR who gained degrees from Research I, Doctoral I and Doctoral II and Comprehensive I do not differ significantly from DMR from the corresponding institutions.

In terms of the interaction between the net effect of IMR on earnings and institutional control, IMR from private institutions perform better in the job market in terms of annual earnings than IMR from public institutions when each of them was compared to one's DMR counterparts. Specifically, after taking into account demographic, educational and job market characteristics, IMR who graduated from public institutions suffer a significant earning loss of 7.37% as compared to their DMR peers. Yet IMR who gain degrees from private institutions do not differ significantly in terms of the annual earnings as compared to their DMR peers.

Table 12. Estimated Effects of being International Master's Recipients on Log Earnings by Field of Study, Carnegie Classification and Institutional Control

Category of Field of Study							
	Biology & Agricultural Science	Mathematics & Computer science	Physical, Chemistry & Physics	Psychology	Social science	Engineering	Health
IMR†	-0.0286	0.0273	-0.0824	-0.0015	0.0474	-.1224***	-0.1074
S.E.	-0.0917	-0.0492	-0.067	-0.2126	-.573	-0.0329	-0.0883
N	925	1,371	795	1,080	1,701	4,548	826
Adjusted R Square	0.3869	0.363	0.4395	0.1014	0.2643	0.3255	0.1659
Carnegie Classification							
	Research I	Research II	Doctoral I	Doctoral II	Comprehensive I	Public	Private
IMR†	-0.0451	-.1415**	0.0802	0.065	-0.153	-.0737*	-0.0275
S.E.	-0.0273	-0.0439	-0.0617	-0.0946	-0.0786	-0.0362	-0.0307
N	5,192	1,295	820	1,048	2,891	7,819	3,427
Adjusted R Square	0.3403	0.4505	0.3704	0.4233	0.1995	0.2628	0.2793

Note. †DMR is the reference group; *p<.05; **p<.01; ***p<.001(two-tailed tests).

Model 3. Does country of origin have a significant effect on annual earnings? As shown in Table 13, Indian international master's recipients performed much better in annual earnings in the U.S. job market than Chinese international master's recipients as compared to domestic master's recipients. Table 13 shows that IMR from China faced a statistically

significant loss, a 13.56% disadvantage in earnings as compared to domestic master’s recipients who born in the U.S. On the other hand, IMR from India did not differ significantly in earnings compared to domestic master’s recipients.

Table 13. Estimated Effects of Country of Birth on Log Earnings

Variables	Coefficient	S.E.
China	-.1356***	0.0353
India	-0.0011	0.0291

Note. *p<.05, **p<.01, ***p<.001 (two-tailed tests).

Analyses on Overall Job Satisfaction

To investigate the effect of international status on job satisfaction, I ran an ordered logistic regression model on demographic, educational and job market factors to answer the research question of whether international status has a significant effect on job satisfaction (Model 1). In Model 2, I did subgroup analysis by running seven separate ordered logistic regression models by major, five separate ordered logistic regression models by Carnegie classification and two separate ordered logistic regression models by institutional control to answer how the effect of international status on job satisfaction differs by major and college quality (Model 2). In model 3, by comparing the career outcomes of international master’s recipients from India and China with domestic master’s recipients, this analysis was to answer whether country of origin has a significant effect on job satisfaction (Model 3).

Model 1. Does the effect of international status have a significant effect on job satisfaction? Table 14 illustrates the process of model configurations by using the stepwise strategy in the analysis on the net effect of being IMR on the overall job satisfaction. Step 1 included the variable of being IMR only (with DMR being the reference group). Model 1 indicated that IMR are 9% more likely to be satisfied with their jobs than their DMR, but this coefficient was not statistically significant. In step 2, after adding demographic covariates, the

coefficient of being IMR on the job satisfaction increased from 1.09 to 1.14, but it was still not statistically significant. Then, after educational experience variables and job market characteristics were further controlled, the coefficient increased from 1.14 to 1.2, but it was still not statistically significant. In step 4, after controlling for demographic, educational and job market factors, the coefficient slightly decreased from 1.2 to 1.12, which indicated that there were no statistically significant differences in job satisfaction between international and domestic master's recipients. As for how demographic, educational and job market characteristics influence job satisfaction, findings are presented in Appendix 3.

Table 14. Estimated Effects of Being International Master's Recipients on Overall Job Satisfaction

Variables		Step 1	Step 2	Step 3	Step 4
IMR (DMR is the reference group)	Coefficient	1.09	1.14	1.2	1.12
	P-value	-0.0768	-0.1453	-0.1549	-0.1586
Pseudo R Square		0.0001	0.0042	0.0217	0.0246

Note. Step 1 only included international status in the analysis; step 2 included international status and demographic factors. In step 3, educational background factors were added to the analysis. In step 4, job market characteristics were added to the analysis (major-job match and earnings included in step 4).

Model 2. How does the international status effect on job satisfaction differ by field of study, Carnegie classification and institutional control? Table 15 presents the subgroup models by field of study, Carnegie classification and institutional control.

Subgroup analyses by field of study. As shown in Table 15, the magnitudes and directions for the coefficients of being IMR on job satisfaction differ across different fields of study, but none of net effects of being IMR on job satisfaction by field of study are statistically significant. Although being IMR does not play a significant role in shaping the overall job satisfaction for master's recipients, the relationship between IMR status and job satisfaction is

not constant across all the majors. Specifically, among master’s recipients who majored in Physical Science, Chemistry and Physics, Engineering and Health, being IMR has a positive relationship with the overall job satisfaction among master’s recipients, but of master’s recipients who majored in Biology and Agriculture, Mathematics and Computer science, and Psychology and Social science, being IMR actually negatively influence the overall job satisfaction.

Table 15. Estimated Effects of being International Master's Recipients on Job Satisfaction by Field of Study, Carnegie Classification and Institutional Control

Category of Field of Study							
	Biology & Agricultural Science	Mathematics & Computer science	Physical, Chemistry & Physics	Psychology	Social science	Engineering	Health
IMR†	0.9692	0.7313	1.56	0.9738	0.8407	1.07	2.88
S.E	0.3755	0.215	0.6289	0.62222	0.3061	0.1436	2.0755
N	925	1,371	795	1,080	1,701	4,548	826
Carnegie Classification and Institutional Control							
	Research I	Research II	Doctoral I	Doctoral II	Comprehensive I	Public	Private
IMR†	0.9525	2.3*	1.14	1.45	1.32	1.01	1.22
S.E.	0.1803	0.8635	0.499	0.5424	0.3679	0.19	0.259
N	5,192	1,295	820	1,048	2,891	7,819	3,427

Note. †DMR is the reference group; *p<.05; **p<.01; ***p<.001(two-tailed tests).

Subgroup analyses by Carnegie classifications and institutional control. The results in this section find that although IMR and DMR in general do not show significant differences in overall job satisfaction, IMR who graduated from Research II institutions differ significantly in their overall job satisfaction as compared to DMR who graduated from the same institutions. Specifically, all things being equal, IMR who graduate from Research II institutions are 2.3 times more likely to be satisfied with their job as compared to DMR with degrees from Research II institutions (odds ratio=2.3, p<.05). In contrast, IMR from Research I, Doctoral I, Doctoral II and Comprehensive I do not differ significantly from DMR from the corresponding institutions in terms of job satisfaction. Similarly, IMR are more satisfied with their jobs than DMR in both public and private institutions, but these differences are not significant.

Model 3. Does country of origin have a significant effect on job satisfaction? Table 16 reports how the effect of being IMR on the overall job satisfaction differs by their birth country. This result shows that Indian international master’s recipients were more satisfied with their jobs than Chinese international master’s recipients were. Specifically, all things being equal, international master’s recipients who were born in India were 1.43 times more likely to be satisfied with jobs as compared to domestic master’s recipients who were born in the U.S. (odds ratio=1.43, $p<.05$). On the other hand, international master’s recipients from China did not differ from domestic master’s recipients in terms of job satisfaction (odds ratio=0.69, $p>.05$).

Table 16. Estimated Effects of Country of Birth on Overall Job Satisfaction

Variables	Odds Ratio	S.E.
China	0.6956	0.1364
India	1.43*	0.2312

Note. * $p<.05$; ** $p<.01$, *** $p<.001$ (two-tailed tests).

Summary

This chapter presents the findings of four analyses conducted in order to answer the four research questions proposed in the present study. Findings indicated that international status had a significant negative effect on annual earnings, but did not affect major and job match and job satisfaction significantly. In addition, this study also found that the international status effect on three employment outcomes differs by major and college quality. Lastly, international master’s recipients from India and China demonstrated largely different career outcomes as compared to domestic master’s recipients born in the U.S. A detailed summary of findings is presented in chapter 6.

Chapter 6: Conclusions

This chapter discusses the results of the research conducted and implications for the U.S. postsecondary institutions and future research. First, I summarize the findings from the data analyses in terms of how international master's recipients differ from domestic master's recipients in major-job match, annual earnings and overall job satisfaction in the U.S. job market in the early stage of their careers. Then this section moves on to discuss how these findings enrich the prior literature on studying the employment outcomes of college graduates, racial minorities and immigrants. Furthermore, a detailed discussion of implications of these findings for higher education institutions and future research is conducted.

A Summary of Research Questions

By examining the employment outcomes of international master's recipients who graduated from the U.S. institutions from 1999 to 2009 as compared to their domestic peers, the present research primarily investigates the following questions:

1. What are the descriptive trends of international and domestic master's recipients who worked in the U.S. in the early stage of their careers?
2. Does international status play a unique role in determining job market outcomes (major-job match, salary, and job satisfaction) after controlling for relevant demographic, educational and job market characteristics?
3. Does the effect of international status on the three employment outcomes differ significantly by field of study and institutional quality as measured by Carnegie classification and institutional control?

4. How does international master's recipients' country of origin (International master's recipients from China and India as compared to domestic master's recipients from the U.S.) shape their employment outcomes?

International Master's Recipients Working in the U.S. Job Market: Descriptive Trends

The results of descriptive analyses on international master's recipients reflected the general characteristics of international students who work in the U.S. in their early career stages. In particular, the descriptive findings in this study provide a better understanding of the landscape of international students working in the U.S. in terms of demographic information, educational attainments, as well as job market characteristics.

Demographic characteristics. In terms of demographic information, international master's recipients who worked in the U.S. upon graduation can be characterized as a group who are primarily male and Asian, are younger than their domestic peers, come from relatively high socioeconomic families, and are less likely to be married and to have children as compared to their domestic peers. The demographic information of international master's recipients reflects the general global trends of international student mobility for the past decades in the U.S.

First, the majority of international master's recipients are male (67.4%) as compared to their female peers (32.6%). The gender difference of international master's recipients working in the U.S. reflects the general demographic characteristics of international students' mobility in the U.S. For the past decades, male international students outnumbered their female peers, although this gender gap among international students have been closing in recent years (Koh, 2015). The finding that the majority of international master's recipients are Asian (83.17%) and are primarily from India (49.94%) and China (20.78%) is consistent with the continuous trend in the global international student mobility that India and China have been the top two sending

countries from 2000 to 2010, contributing approximately 20.9% to 33.7% of the total international students studying in the U.S. (IIE, 2000-2010; Koh, 2015).

In terms of parental education, 88.52% of international master's recipients who had parents holding college degrees indicates that most international master's recipients are from relatively high socioeconomic backgrounds. This finding is consistent with the prior literature that in addition to the limited financial support from the U.S. institutions, family is still the primary financial resource for international students pursuing master's degrees, especially for those from China (Lu & Schulmann, 2007). The different family structure between international and domestic master's recipients, namely the lower probability of being married and having children for international master's recipients relative to their domestic peers, may reflect the challenge in balancing career and family faced by international master's recipients in their early career stages. As found by Qian (2013), Whites tend to be more likely to get married than the racial minorities, perhaps because racial minorities need to invest more time and social and human capital in workplace to achieve career success comparable to Whites, which might prevent them from investing in marriage and family (Qian, 2013). Certainly, this family structure discrepancy between international and domestic master's recipients may be also attributed to the fact that international master's recipients are relatively younger (28 years old) than their domestic peers (31 years old) when they enter the workforce.

Educational backgrounds. The descriptive analyses on international master's recipients' educational experiences indicate an evident employability difference between STEM and non-STEM fields for international students. Of international master's recipients who work in the U.S., 94% of them majored in STEM majors, which reflects the strong workforce need for foreign talent in the STEM fields, but also depicts the struggles for non-STEM international

students to turn their degrees into jobs in the U.S. (Stephan & Levin, 2003; U.S. Bureau of Labor Statistics, 2014; *Bloomberg Businessweek*, 2014). From 2000 to 2010, the biggest proportion of international students studied Business and Management (from 17% to 21%) in the U.S. postsecondary institutions, yet most business graduates at master's level struggle to find jobs in the U.S. due to a variety of reasons, such as the visa restrictions and deficiencies in language, networking and American culture (*Bloomberg Businessweek*, 2014). Case in point, the total number of international master's recipients who majored in business in this study is only 3 and they were excluded due to the extremely low sample size.

In addition, this research found that international master's recipients are more likely to graduate from higher rank institutions as measured by the Carnegie classification and are more likely to have higher undergraduate GPA as compared to their domestic peers. For instance, 62% of international master's recipients received master's degrees from Research I and Research II institutions relative to 56% of domestic master's recipients. Over 83% of international master's recipients hold undergraduate GPA higher than 3.25, while this corresponding figure for domestic master's recipients is only around 65%. This finding seems to suggest that at least at the master's level, international students may need to accumulate more human capital than their domestic peers in order to successfully locate jobs in the U.S., which supports the over-education view from prior literature that racial minorities in the U.S., Asian Americans in particular, tend to overachieve in terms of educational attainment in order to possibly gain parity with Whites in the U.S. labor market (Hirschman & Wong, 1984; Kim & Sakamoto, 2010; Sakamoto, Goyette & Kim, 2009). Furthermore, this finding also expands the prior literature that even with the same master's degrees, international master's recipients may still overachieve as compared to their domestic peers in the measure of college quality and academic performance.

Job market characteristics. International master's recipients' preference for industry and government over educational institutions is evident in this study in that 80% of international master's recipients worked in industry and government. This trend indicates that international master's recipients demonstrated different patterns in selecting employment sectors from international doctoral recipients, who are relatively evenly distributed in the four-year institutions (25%) and industry (24%) according to a recent research by Roh (2015). This may also indicate that industry may be more attractive to international master's recipients, perhaps because of the commonly higher wages in industry. In addition, there are not many positions in higher education institutions for individuals with only a master's degree. Further, the work visa advantages for postsecondary institutions (international students are more likely to gain H-1B in a postsecondary institution than those who work in industry) may be not as appealing to international master's recipients as expected by immigration policy makers (USCIS, 2015).

Regarding employer size and being supervisors, International master's recipients are 7.89% less likely than domestic master's recipients to work for employers with more than 25,000 employees (12.86% vs.20.75%), and are 9.87% less likely than DMR to be supervisors (20.31% vs. 31.18%). Prior literature has revealed consistent empirical evidence for the positive relationship between earnings and employer size (Brown & Medoff, 1989; Belfield & Wei, 2004; Morissette, 1993), so the lower probability of joining the biggest size organizations may indicate that international master's recipients still face obstacles in locating jobs in big size employers. Further, the finding that international master's recipients have a lower chance of gaining supervisor status than their domestic peers, even in the early stage of their careers, is consistent with the glass-ceiling view, which stated that racial minorities tend to struggle to

achieve advancement into higher rank positions of authority as compared to Whites (Kim & Zhao, 2014; Woo, 2000).

The Effect of International Status on International Master's Recipients' Three Employment Outcomes

The effect of international status on major-job match. This study found that after controlling for demographic, educational and job market characteristics, international master's recipients are two times more likely than domestic master's recipients to hold jobs that are related to their master's degree (odds ratio=2.00, $p<0.001$). Contrary to the neo-racism view that international students might be disadvantaged in the U.S. job market (Balibar, 1992; Barker, 1981; Hervik, 2004; Spears, 1999; Lee & Opio, 2007; Lee & Rice, 2007), this study found that all else being equal, international master's recipients are actually two times more likely to have jobs related to their majors as compared to their domestic peers. Perhaps the higher probability of having jobs related to their majors for international master's recipients relative to domestic master's recipients can be largely explained by the current U.S. temporary visa regulations. In order for international master's recipients to legally work in the U.S., they have to apply for an H-1B working visa, which imposes several constraints on what employment can be taken (USCIS, 2015). One key requirement for international students to gain the H-1B visa is that international students' job must be in an occupation that is closely related to their field of study (USCIS, 2015). The finding in this study suggests that this H-1B regulation seems to effectively assure that international master's recipients can be employed only by jobs that are related to their field of study. In the early stage of their careers, international master's recipients' opportunity to choose jobs is strongly constrained by this visa regulation, whereas their domestic recipients can freely select jobs at their will. The effect of H-1B regulation on major-job match, however, may

only be evident before international master's recipients gain their permanent resident status as research shows that once international students gained the permanent resident status, their career outcomes, such as pay, job mobility and job opportunities are all significantly improved (Lan, 2013).

This finding also indicates that, as compared to immigrants without U.S. degrees, international master's recipients were able to locate jobs that are related to their majors. Prior literature studying foreign immigrants, most of whom did not hold U.S. postsecondary degrees, revealed that immigrants were more likely to hold jobs unrelated to their college major in the host country compared to domestic workers (Arbeit & Warren, 2013; Dean, 2009; Frank, 2009; Trevelyan & Tilli, 2010). The H-1B regulation may to some extent influence the chance of getting jobs related to their majors for international master's recipient's, but on the other hand, the comparison between international master's recipients and immigrants without U.S. degrees in terms of major-job match seems to support the importance of human capital theory in explaining why international master's recipients are able to located jobs related to their majors. Essentially, it is skills and knowledge they acquire in the U.S. institutions that help them locate jobs related to their majors. Thus, this study suggests that neo-racism may be limited in explaining international master's recipients' non-economic outcomes, such as major-job match, and human capital theory may be more useful in explaining the advantaged career of international master's recipients in major-job match.

The effect of international status on annual earnings. This study first revealed that being international has a net negative effect on international master's recipients' annual earnings. That is, after controlling for demographic, educational and job market characteristics relevant to job market productivity, international master's recipients working in the U.S. job market face a

6% earnings disadvantage as compared to domestic master's recipients. The net negative effect of international status on earnings is consistent with the findings from prior literature, that although international students received degrees from the U.S. institutions, they still face a significant earning loss as compared to their domestic peers with the same degrees (Chakravartty, 2006). This finding also lends some support to the neo-racism view, which suggests that international students and international postdoctoral researchers suffer from a new form of discrimination against their culture instead of race, which prevents them from advancing their career success as much as their domestic peers, even with similar professional qualifications (Cantwell & Lee, 2010; Lee & Opio, 2007; Lee & Rice, 2007). Building on the previous studies that focused on the possible discrimination against international students' foreign culture on campus (Lee & Opio, 2007; Lee & Rice, 2007), this study implies that this new form of discrimination may follow international students to their workplace, which could create barriers for them to be unable to gain career outcomes comparable to their domestic peers. As explained by Cantwell & Lee (2010), international status in the job market is more than a mere legal category, but rather a perception of cultural stereotypes. It, however, is worth noting that this study never attempts to declare that the significant earnings differences between international and domestic is absolutely due to the effect of neo-racism because there could be other uncontrolled factors that contribute to this earning difference. Certainly, after controlling for a comprehensive set of productivity-related covariates, the net negative effect of international status on earnings supports the influence of neo-racism on international master's recipients' economic return on their educational investments.

The neo-racism view helps explain why international master's recipients still have a statistically significant earning loss after related demographic, educational and job market

characteristics are controlled. This finding seems to support that human capital theory has a flaw that limits its ability to fully explain the career outcomes of college graduates. In the U.S. job market, international master's recipients need to negotiate with employers to determine the market value of their U.S. credentials, thus in this process, international status may play an important role in negatively shaping their ability to convert their U.S. education into career success.

The effect of international status on job satisfaction. This study reveals that after taking into account relevant demographic, educational and job market characteristics, international master's recipients did not demonstrate significant different job satisfaction as compared to domestic master's recipients. The finding is not consistent with the prior literature on international faculty and immigrants who tend to be more productive but are less satisfied with their jobs than their U.S.-born peers (Corley & Sabharwal, 2007; Mamiseishvili, 2011; Yap, Holmes, Hannan & Cukier, 2013). Contrary to the neo-racism view that supports the negative effect of international status on job market outcomes (Balibar, 1992; Barker, 1981; Hervik, 2004; Spears, 1999; Lee & Opio, 2007; Lee & Rice, 2007), this study found that international status does not have a sizeable impact on international master's recipients' overall job satisfaction.

The reason why international master's recipients are as satisfied with their jobs as their domestic master' recipients warrants advanced research, but there are several factors that might help explain this finding. First, international master's recipients may perceive the struggles of converting their human capital into career success at the early stage of their careers as a price they need to pay for gaining permanent resident status (Matloff, 2004). Besides, international master's recipients may realize that after they receive their permanent resident status, they will be able to be freed from the visa restrictions and expect to gain better employment outcomes

(Lan, 2013). Third, although they may face an earning loss in the U.S. job market as compared to their domestic peers, they are still more likely to enjoy advantaged career outcomes as compared to their peers in their home countries with similar professional qualifications. For instance, the average monthly salary for chemical engineers in the United States in 2005 was \$4,710, whereas the corresponding figure for chemical engineers in China was \$1,076 (The International Average Salary Income Database, 2005). As further explained by Cheung (2014), low income, inadequate research facilities, a social connection based environment and a polluted natural environment are preventing Chinese students from returning home.

In addition, this finding also suggests that neo-racism is limited in explaining the job satisfaction of international master's recipients as compared to domestic master's recipients. Further, human capital theory hypothesized that international master's recipients receive the similar academic training in U.S. institutions and get employed with the same master's degree, there should not be significant career outcome differences between these two groups, all things equal, thus this finding seems to support the use of human capital theory in explaining the fact that international and domestic master's recipients did not differ significantly in job satisfaction.

It is important to note the different measures of job satisfaction in this study from previous studies examining job satisfaction of international faculty and scientists (Corley & Sabharwal, 2007; Mamiseishvili, 2011). Particularly, this study measured the overall job satisfaction of international and domestic master's recipients on their jobs, while previous studies studying the job satisfaction of international faculty and scientists measured job satisfaction by using multiple job satisfaction on various aspects of working experiences (Corley & Sabharwal, 2007; Mamiseishvili, 2011). Therefore, findings of this study related to job satisfaction needs to

be interpreted differently from previous studies on the job satisfaction of international faculty and scientists.

The Effect of International Status on Three Career Outcomes by Field of Study and College Quality

The effect of international status on major-job match by field of study, Carnegie classification and institutional control. The subgroup analysis indicates that although the effect of international status on major-job match differs across majors, Carnegie classifications and private and public institutions, but this difference does not seem to be significantly large. International master's recipients did not differ significantly in terms of major-job match as compared to domestic master's recipients across fields of study. IMR who majored in Mathematics and Computer science, Social science and Engineering are more than two times more likely to have jobs related to their majors as compared to domestic master's recipient in the corresponding fields. Prior literature suggested that college graduates majoring in STEM fields and health professions had a higher likelihood of finding jobs related to their field of study than those majoring in social sciences and liberal arts (Robst, 2006, 2007; Robst et al., 2012). This finding extends the understanding of major-job match in previous studies by identifying that even within the social science field, international master's recipients are still more likely to find jobs related to their majors. As suggested above, it might be due to the H-1B regulation that assures that international master's recipients can be employed only by jobs that are related to their field of study (USCIS, 2015). Thus, this finding indicates the possible link between immigration policies and career outcomes of international master's recipients.

International master's recipients who graduated from Doctoral I, Comprehensive I and Research I institutions perform slightly better in the job market in terms of major-job match than

International master's recipients who gained degrees from Research II and Doctoral II institutions relative to their domestic master's recipients. In addition, the likelihood of having jobs related to their master's majors is slightly higher for International master's recipients who graduated from public institutions than International master's recipients from private institutions as compared to their domestic counterparts. Again, the variance of the difference between international and domestic master's recipients in major-job match does not seem to be significant across Carnegie classifications and public and private institutions.

The effect of international status on annual earnings by field of study, Carnegie classification and institutional control. The present study found evidence that the effect of international status on the job market success is not fixed, but varies significantly by field of study, college type and academic performance.

The first interesting finding is that among international master's recipients majoring in seven fields of study, international master's recipients who majored in engineering face the largest earnings loss. In particular, all else being equal, international master's recipients with engineering majors face a 12.24% annual salary loss as compared to their domestic engineering peers in the U.S. job market in the early stage of their careers (three years after graduation). International master's recipients with the other six majors, however, do not differ significantly from their domestic peers with the corresponding majors in terms of annual earnings. This finding is consistent with the prior literature on the income gaps between foreign-born and domestic engineers and scientists, which found that foreign-born engineers face a salary penalty as compared to their domestic peers (Corley & Sabharwal, 2007; Tang, 1993). Because the prior literature on the economic career outcomes of foreign-born engineers failed to differentiate foreign-born engineers with U.S. degrees and with foreign degrees (Corley & Sabharwal, 2007;

Tang, 1993), this finding extends these previous studies by confirming that even with the same U.S. master's degrees, international engineers still face a significant penalty in salary as compared to their domestic engineers.

In addition to enriching the prior literature on the economic employment outcomes of foreign-born engineers, this finding also raises an important question about international engineering master's recipients. That is, why are international engineering master's recipients disadvantaged the most in converting their U.S. credentials into economic employment outcomes relative to their domestic Engineering peers? It is important to explore reasons behind this earning gap between international and domestic engineers, given that international engineers are highly demanded in the U.S. job market and are considered the primary driving force for American science and technology developments in the context of global knowledge economy (Stephan & Levin, 2003; Wadhwa, Saxenian, Freeman, & Salkever, 2009).

While further research is definitely warranted in thoroughly explaining this question, prior literature suggests that there might be several intertwined factors that come into play. First, as illustrated above, neo-racism helps explain why this income inequality occurs in the engineering workforce in the U.S. job market, thus it may be the case that international master's recipients in engineering fields are more likely to be exploited than those international workers in other fields, possibly due to neo-racism or for cost saving (Matloff, 2013). The second possible explanation is that as compared to other fields, international scientists and engineers may be more disadvantaged than international master's recipients in other fields in terms of social capital accumulation, which has been found to be critical for career advancement among employees with similar educational attainments and professional qualifications. For instance, by studying the career potentials of computer engineers of a major bank, Friedman and Krackhardt (1997)

argued that Chinese and Asian Indian engineers are socially and culturally different from the dominant White group and thereby are less likely than foreign engineers from European countries to turn their education into social capital needed for career advancements. Given the language deficiency among international engineers (Gordon, DiTomaso & Farris, 1991), a lack of social networking that could be detrimental for improved careers could be a reasonable cause for the income inequality for international master's recipients with engineering majors, especially in the early stage of their careers.

In examining the career disparity between international and domestic master's recipients' related to institutional stratification, this research yields several interesting findings. The first interesting finding is that international master's recipients who graduated from Research II institutions in Carnegie classifications suffer a significant 14.15% earnings loss as compared to their domestic master's recipients from the same institutions, all else being equal, but other international master's recipients who graduated from Research I, Doctoral I and Doctoral II and Comprehensive I did not have a statistically significant disparity with their domestic peers from the corresponding institutions. Moreover, international master's recipients who graduated from public institutions suffer a significant earning loss of 7.37% as compared to their domestic peers. Yet international master's recipients who gain degrees from private institutions do not differ significantly in terms of the annual earnings as compared to their domestic peers. The significant income inequality between international and master's recipients who received degrees from Research II institutions and public institutions seems to imply that the effects of institutional characteristics on labor market outcomes may vary by individual characteristics, specifically by the international status in this case. This finding is consistent with the previous studies, which suggests that even with the same credentials, individual graduates differ significantly in their

capacities in translating the credentials into labor market success (Borgen, 2015; Karabel & Mcclelland, 1987; Rivera, 2011; Rivera, 2015). With the possible discrimination against international master's recipients and their lack of social capital for career improvements, international master's recipients might be reasonably deficient in converting their college degrees into career success. Since prior studies suggested that the disadvantaged family backgrounds might be the driving force that causes college graduates to convert their credentials into career success differently (Borgen, 2015; Karabel & Mcclelland, 1987; Rivera, 2011; Rivera, 2015), this finding adds to the prior literature that in addition to family origin, international status might be another factor that needs to be considered when studying the income disparity and effects of college quality. This interpretation, however, can not explain why international master's recipients who received degrees from Research I, Doctoral I and Doctoral II and Comprehensive I institution and from private institutions did not differ significantly from their domestic peers. While more research is needed to explain why international master's recipients from Research II and public institutions are significantly disadvantaged in the labor market, this study nonetheless provides useful insights that international master's recipients as a group have difficulties in converting their degrees into monetary career success. Further, the extent to which they are disadvantaged relative to their domestic peers is not fixed across institutions, but varies significantly by Carnegie classifications and institutional control.

Furthermore, another interesting pattern is that despite the fact that international master's recipients who graduated from Research II institutions in Carnegie classifications suffer a significant 14.15% earnings loss as compared to their domestic master's recipients from the same institutions, they are actually 2.3 times more likely to be satisfied with their job as compared to domestic master's recipients with degrees from Research II institutions (odds ratio=2.3, $p < .05$).

In contrast, international master's recipients from Research I, Doctoral I, Doctoral II, Comprehensive institutions and from private and public institutions did not differ significantly from domestic master's recipients from the corresponding institutions in terms of job satisfaction. This finding fits the basic pattern of international master's recipients as a group that they make less than their domestic peers but they are equally satisfied with their jobs. More research, however, is definitely warranted in answering why international master's recipients who graduated from Research II institutions in particular are significantly more satisfied with their jobs while suffering a 14.15% earnings loss relative to their domestic peers.

The effect of international status on job satisfaction by field of study, Carnegie classification and institutional control. The effect of international status on job satisfaction did not differ significantly across fields of study, public and private institutions, but the international domestic master's recipients shows a significant difference in job satisfaction as compared to domestic master's recipients across Carnegie classifications. Specifically, all things being equal, IMR who graduate from Research II institutions are 2.3 times more likely to be satisfied with their job as compared to DMR with degrees from Research II institutions (odds ratio=2.3, $p < .05$). In contrast, IMR from Research I, Doctoral I, Doctoral II and Comprehensive I do not differ significantly from DMR from the corresponding institutions in terms of job satisfaction.

The finding that international master's recipients who received degrees from Research II institutions are more likely to be satisfied with their jobs than international master's recipient who graduated from Research I institutions seems to suggest that measures of college quality are not positively associated with job satisfaction. This finding supports the previous studies, which found that college quality and prestige did not significantly affect job satisfaction (Judge, Cable, Boudreau, & Bretz, 1995). It is unclear why international master's recipients with degrees from

Research II institutions are more satisfied with their jobs than those who graduated from other institutions, but this finding nevertheless hints that it may be necessary to test how college quality influences job satisfaction of international master's recipients.

The Effect of Countries of Origin on International Master's Recipients' Three Career Outcomes

By examining how international master's recipients from India and China differ from domestic master's recipients born in the U.S., this study found that international master's recipients from India perform much better in the U.S. job market than international master's recipients from China in annual earnings and job satisfaction except for major-job match. Specifically, international master's recipients from China are slightly more likely to find jobs related to majors than those who are from India. However, in terms of annual earnings, Chinese international master's recipients had a significant 13.56% loss as compared to domestic master's recipients, while Indian international master's recipients almost gained parity with domestic master's recipients in annual earnings. Further, India master's recipients are significantly more satisfied with their jobs in the U.S. as compared to domestic master's recipients, whereas Chinese international master's recipients did not differ significantly from domestic master's recipients in job satisfaction.

It is interesting that commonly considered as culturally similar, international master's recipients from China and India actually demonstrate substantial career differences in salary and job satisfaction. This finding supports previous studies, which emphasized the importance of studying the effects of countries of origin on immigrants' career outcomes (Bratsberg & Ragan, 2002; Hou & Balakrishnan, 1996; Phythian, Walters, & Anisef, 2011; Reitz & Breton, 1994). Building on the previous studies suggesting the distinct cultural differences between Asian and

European international workers may be associated with different career advancements (Cantwell & Lee, 2010; Chakravartty, 2006; Lee & Rice, 2007), this finding further reveals that even within Asian countries, there might still be significant career differences among different countries of origin. This finding also confirms the significance of the demographic heterogeneity view in studying the career outcomes of Asian Americans, which argues that the category of Asian Americans should be disaggregated due to the significant variance among these sub-groups in terms of immigration patterns, nativity and generational status that could influence their career outcomes in the U.S. as compared to Whites (Sakamoto, Wu, & Tzeng, 2000; Sakamoto & Kim, 2003; Xie & Goyette, 2004; Zeng & Xie, 2004).

The significantly different career outcomes between Indian and Chinese international master's recipients supports the view based on neo-racism theory that the extent to which international master's recipients suffer from this new discrimination in the labor market may be not universal but instead could differ by nationality (Lee & Rice, 2007; Lee & Opio, 2007; Cantwell & Lee, 2010). Perhaps Indian international master's recipients are less likely than Chinese master's recipients to be discriminated in the U.S. job market, thus they had better career outcomes in earnings and job satisfaction than Chinese master's recipients. As for why Indian international master's recipients are less likely to be discriminated in the U.S. job market than Chinese international master's recipients, there is certainly a need for further research to explain the substantial career differences between Chinese and Indian international master's recipients, but several factors might be critical in explaining this difference. The first factor is English language skill. International master's recipients from India have the clear advantage of prior English proficiency as compared to those who are from China. For instance, a prior study found that 70% of Indian immigrants in the U.S. report having strong English language skills,

compared to only 49% of immigrants from China (Whatley & Batalova, 2013). With the stronger English language skills, Indian international master's recipients may be less likely to face discrimination in the job market than Chinese master's recipients. In addition, the language advantage for Asian Indians has proven beneficial in helping them assimilate into American culture (Jayakar, 1994), thus the language advantage may assist Indian master's recipients in converting their U.S. degree into career improvements better than those master's recipients from China. In addition, another distinct difference between Chinese and Indian immigrants is the pace of integrating into the U.S. culture. Previous studies have documented that Asian Indian immigrants were integrate in U.S. culture at a faster rate compared to the Chinese immigrants, possibly due to language advantages and differences in national cultures (Chand & Ghorbani, 2011; Hofstede, 2007). In particular, Indian immigrants are likely to have looser and more diluted social networks within their ethnic community, whereas Chinese immigrants tend to have closer ties within their ethnic community (Chand & Ghorbani; 2011; Hofstede, 2007). This difference seems to drive Indian immigrants to be more likely to integrate into the mainstream U.S. culture, while Chinese immigrants tend to struggle to manage the clash of cultural values between traditional Chinese values and American ideals (Mui, 1996). If Indian international master's recipients are more likely to integrate into U.S. culture, then they may be less likely to face discrimination in the U.S. job market as compared to Chinses international master's recipients. Therefore, it may be plausible to assume that neo-racism plays an important role in shaping the career differences between Indian and Chinese international master's recipients in the early stage of their careers.

Policy Implications for Postsecondary Institutions and the U.S.

The findings of this study suggest several important implications for policy makers for the higher education institutions in terms of international students recruiting strategies and preparing them for career success, as well as for the U.S. in terms of utilizing and retaining foreign talent. I will first discuss the policy implications of this study for the U.S. institutions and then move on to shed light on how the U.S. can better retain and compete for foreign talent.

Policy implications for the U.S. institutions. The disadvantaged career outcomes of international master's recipients as indicated by this study, coupled with the alarming slowdown in the number of international applications to American graduate schools, may serve as a wake-up call for U.S. institutions to pay more attention to track, examine, and assess the career outcomes of international students. The findings from this study suggest that international master's recipients as a group and engineering international master's recipients in particular, have significant disadvantages in fully converting their U.S. degrees into economic career outcomes in the early stage of their careers. The struggles of gaining parity with their domestic peers in the private return to their investments in the U.S. higher education may discourage future international graduate students to choose the U.S. as their study abroad destination. In fact, this concern may not be merely a groundless speculation. According to a study of admissions data by the Council of Graduate Schools (2013), U.S. higher education in 2013 has witnessed an alarming slowdown in the number of international applications to American graduate schools—only 1 percent increase in international graduate applications and a 5% decline in the number of Chinese students applying to US graduate schools. This decrease is potentially troubling for U.S. graduate schools, especially, engineering and science departments, which rely heavily on

international students to offset the decreasing domestic enrollments (Carnevale, Smith & Strohl, 2010).

This slowdown in international graduate applications could be attributed to a variety of factors, other than the possible disadvantaged career outcomes of international master's recipients, but this decline should be taken seriously by U.S. institutions because this decline might be not temporary. Instead, it is almost inevitable that U.S. institutions will face more rigid challenges in attracting high quality international graduate students because for some foreign students, the U.S. is losing its attractions. First, with the large number of international students returning to home countries voluntarily or involuntarily, U.S. degrees alone are not enough for international students to stand out in the highly competitive job markets, such as China. This situation makes U.S. working experience more important than ever for Chinese returnees to locate desirable employment or to improve their career outcomes (Gribble, 2014; Gribble & Blackmore, 2012; Lawrence, 2013). However, the rigid visa restrictions in the U.S, coupled with the common disadvantages in locating jobs associated with international students, has led to the majority of international students at the bachelor's and master's level to go back China without enough working experiences (U.S. Government Accountability Office, 2010; The New York Times, 2014). Despite the lack of comprehensive studies on the career outcomes of returnees from the U.S., current studies indicate that Chinese returnees working in venture capital found that they were actually less successful than their counterparts who had remained at home possibly due to a mismatch in skills and weaker social networks (Lawrence, 2013; Sun, 2013). Further, the pipeline of college students in China is drying up. In China, due to the government's one-child policy, there will be 60 percent fewer people aged 20 to 24 by 2030 than in 2010 (The New York Times, 2014; Wang, 2012). Besides, China's continuing investment in its academic

research infrastructure and the goal to create world-class institutions may make it a compelling destination not only for Chinese students but for international students from other countries. Indeed, China hosted about 330,000 students in 2012 and has a target to reach 500,000 students by 2020 (International Consultants for Education and Fairs, 2015).

Therefore, U.S. institutions, especially graduate schools, should be well informed of the intensifying competition for foreign talent among developed countries and the increasing importance of work experience for international students' career outcomes (Lawrence, 2013; Gribble, 2014; Gribble & Blackmore, 2012; OECD, 2008; Shachar, 2006). Furthermore, U.S. postsecondary institutions and graduate education policy makers should expand the definition of institutional effectiveness from attracting and graduating international students to preparing them for improved and rewarding careers by effectively developing, resourcing and implementing initiatives and strategies to improve the career outcomes of international students (Lawrence, 2013, Xu, 2010). Further, as indicated by this study, engineering master's students and Chinese international master's students may face more struggles in converting their education into career success, thus the careers and international offices need to put more emphasis on engineering and Chinese international students at the master's level in order to improve their future employment outcomes.

Policy implications for the U.S. policy makers: The federal role. This study revealed that international master's recipients as a whole have not gained parity with their domestic counterparts in the annual earning outcomes. In particular, one striking finding is that after a systematic controlling for demographic, educational and job market covariates, international master's recipients who majored in engineering face a 12.24% annual earnings loss as compared to their domestic engineering peers.

While this significant income inequity between international and domestic engineers may be attributed to possible neo-racism discrimination, this study, along with the prior literature on the employment outcomes of highly skilled foreigners, points to a direction that the U.S. immigration policy may be a significant factor to be considered in improving international students' career success. The significant income inequity between international and domestic engineers in this study provides some empirical evidence for the view that because H-1B regulations strongly limit the job mobility of foreign workers, and H-1Bs are typically in no position to seek other employment under current H-1B regulations, H-1Bs in information technology industry have become cheap labor as a means for companies to save costs (Matloff, 2003). The mechanism of the employer-driven selection in the H-1B system is to assure that employers identify the most appropriate workers with various skill sets (Papademetriou & Sumption, 2011), but it seems that the H-1B system has provided an opportunity for some employers to abuse the system and to get the cheap and compliant workers (Matloff, 2003). In addition to limiting highly skilled workers' job mobility, the U.S. immigration policies towards highly skilled immigrants, including international students, have been criticized for their inability to prioritize flows effectively, inflexibility and a complex, bureaucratic process (Papademetriou & Sumption, 2011). With international students being considered as the talent pool for the U.S. to maintain a competitive advantage in the knowledge-based global economy (Shachar, 2006) and the intensified global competition for foreign talent among developed countries (Albatch, 2006; Shachar, 2006), immigration policy makers may need to constantly monitor, assess and revisit the effect of immigration policies toward international students in order to keep and maintain the best and brightest talent in the U.S. Further, future policy focus geared toward international students should consider removing barriers of the employer-driven H-1B system

and granting international students' full mobility in the labor market before they gain permanent resident status (Lan, 2013; Matloff, 2003).

Another policy implication is that U.S. policy makers need to set up a national approach to facilitate the international higher education in the U.S., including recruiting, educating and preparing international students for career success. As described by Altbach (2004), the primary international host countries, such as Austria, Canada and the UK, have set up national policies related to international education, including providing incentives to academic institutions to attract international students, but the United States has never put a comprehensive national policy into place for international higher education. Undoubtedly, the U.S. now still holds an inherent advantage in attracting international students due to the perceived high quality postsecondary education and the reputation of cutting-edge research (Altbach, 2004; Papademetriou & Sumption, 2011), but the U.S. must realize that the value of U.S. credentials for international students might be gradually waning. Perhaps in the near future, the U.S. will face an important yet tough task to strengthen the value of the U.S. higher education. This might not occur now, but struggles for international master's recipients to fully convert their U.S. degrees into economic success and the possible difficulties faced by Chinese returnees to have their expected improved career success (Lawrence, 2013; Sun, 2013), do illustrate a strong need for the U.S. policy makers to better understand, facilitate and prepare international students for academic and career success in the U.S.

Implications for Future Research

By examining the employment outcomes of international master's recipients, with an emphasis on the differences between international and domestic master's recipients, this study reveals that at least at the early stage of their careers, international master's recipients have not

gained parity in the annual earnings with their domestic counterparts with the same credentials. However, despite this income disadvantage, international master's recipients are actually advantaged in terms of major-job match and do not demonstrate significant differences in job satisfaction as compared to their domestic peers. This study enriches the research on international students' employment outcomes in the U.S. job market by confirming the presence of income inequality for international master's recipients in the early stage of their careers. Yet there are still a variety of questions that need to be answered in the future in order to have a nuanced understanding of the employment outcomes of international students.

The first important question for future research is to what extent neo-racism influences international master's recipients' career outcomes. The contribution of this study is that it confirms the significant disparity between international and domestic master's recipients in the economic outcomes, which implies that neo-racism may play a role in shaping their career outcomes (Balibar, 1992; Barker, 1981; Hervik, 2004; Spears, 1999). However, this study by no means asserts that income disparity between international and master's recipients can be fully explained by neo-racism because due to the data limitations, this study can not rule out other important factors that could contribute to this income difference, such as language proficiency, social capital deficiency as well the influence of immigration policies. Thus, future research may focus on the extent to which neo-racism shapes the career outcomes of international master's recipients by examining datasets that can completely differentiate the effects of neo-racism from other influences. Further, the neo-racism view helps explain the income disparities between international and domestic master's recipients, but this view is not sufficient in answering why international master's recipients are equally satisfied with their jobs as their domestic peers, even with the salary disadvantages.

The second important research question is whether this income equality is a temporary disadvantage or a lasting issue that follows international master's recipients' career ladder. This study can not address this question due to the cross-sectional nature of the data examined in this study, thus future researchers can examine the longitudinal datasets related to international master's recipients' career outcomes to tackle this issue. Prior studies have indicated that the income inequality between foreign highly skilled workers and domestic workers might be attributed to the limited job mobility caused by the H-1B regulations (Lan, 2013; Matloff, 2003). If this is the case, then the significant income inequality for international master's recipients may vanish after they gain their permanent resident status. If not, the persistent income inequality between international and domestic workers may provide further evidence for the negative effect of neo-racism on international students' career outcomes. In addition, of particular interest for future research is to trace the career outcomes of international master's recipients who major in engineering. The findings of this study reveal the significantly disadvantaged economic return on the U.S. degrees for international master's recipients who major in engineering. Given the significant importance of attracting and maintaining the science and engineering talent for the U.S. economy (National Academy of Sciences, 2007; Organization for Economic Cooperation and Development, 2008; Shachar, 2006), higher education researchers, practitioners and policy makers may need to conduct more research to have a better understanding of why engineering international students particularly have difficulties in converting their U.S. degrees into economic success. Similarly, future research focusing on engineering international master's recipients may need to trace the patterns of the income disparity between international and domestic graduates across different career stages of their careers. With more in-depth studies on international master's graduate, especially those who major in engineering, future research can

inform U.S. institutions about policies to better attract, educate and prepare them for future career success.

In addition, future research is needed to address the presence of career outcome differences between international and domestic master's recipients depending on college quality and country of origin. This study found that international master's recipients from Research II and public institutions are significantly disadvantaged in the labor market as compared to their international peers from other categories of institutions. These findings indicate the possibilities that international master's recipients' disadvantaged outcomes may be linked to the institutional characteristics of public and Research II institutions, but the relationships between institutional characteristics and their future career outcomes are largely unstudied, thus future research can examine the more advanced empirical data to investigate the relationships between international students' career outcomes and institutional characteristics. This line of research can be extremely informative for higher education administrators and practitioners with goals to improve the career success of international students. The findings of this study also confirm the presence of employment outcome heterogeneity across international master's recipients, which supports the notion that the discrimination against international students is not fixed but vary by their country of origin (Lee & Opio; 2007; Lee & Rice, 2007). However, this study can not fully answer why international students born in China and India could have significant career differences in the U.S. market as they are commonly considered to be from similar cultural backgrounds. As China and India have been and may continue to be the top two sending countries of foreign students in the near future (IIE, 2015), it is of particular significance for U.S. institutions to be informed about why international master's recipients from China and India differ significantly in their economic success and job satisfaction. This line of research can shed valuable light on how

career services units adopts different strategies in improving international students' career success in consideration of country of origin.

Conclusion

For the vast majority of international students in the U.S., including students at master's level, the most important return on investment is employment outcomes, which highlights the importance of studying the career outcomes of international master's recipients. Simply put, career outcomes of international master's recipients could significantly influence future international graduate students' intention to study in the U.S. In the context of global competition for foreign talent, it is becoming more important for U.S. institutions to have a better understanding of career outcomes of international master's recipients, which could largely help U.S. institutions in terms of better attracting and recruiting the most talented and bright international students. Using the data from National Survey of Recent College Graduates, this study examined the landscape of early career outcomes of international master's recipients by systematically studying international master's recipients' three monetary and non-monetary career outcomes—major-job match, salary and job satisfaction, with an emphasis on career outcome gaps between international and domestic master's recipients. This study found that international status has a net positive effect on major-job match, has a net negative effect on annual earnings and does not have a statistically significant impact on job satisfaction. In addition, this study also identified that the international status effect on career outcomes is not fixed but vary across field of study and college quality. This study further found the effect of country of origin on employment outcomes of international master's recipients, which suggested that Indian international master's recipients perform much better in the U.S. job market in annual earnings and job satisfaction as compared to Chinese international master's recipients. This study

discussed the need for U.S. institutions to pay more attention to track, examine and assess the career outcomes of international students and for the U.S. policy makers to set up a national approach to facilitate recruiting, educating and preparing international students for career success. It is hopeful that this study can provide useful insights for U.S. higher educational system to better assist international students to succeed in the U.S. job market.

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Appendices

Appendix 1. Estimated effects of Demographic, Education and Job Market Characteristics on Major and Job Match

Variables	Odds Ratio	S.E.
IMR(DMR being the reference group)	2.002***	0.2834
Demographic Variables		
Age	0.9847**	0.0051
Male	1.01	0.0784
First Generation students	0.9328	0.0621
Marital Status	1.13	0.0796
Having at least one child		
Race/Ethnicity		
Asian	0.8224	0.1164
Black	.6558***	0.0769
Hispanic	0.8357	0.0981
White(Reference group)		
Field of Study for Master's degree		
Engineering	0.9241	0.1025
Mathematics and Computer science	1.49**	0.1988
Physical science, Chemistry and Physics	0.992	0.1508
Psychology	1.31*	0.1735
Social science	0.4939***	0.0576
Health	2.67***	0.406
Biological and Agricultural Science (Reference group)		
Carnegie Classifications		
Research II Universities	1.009	0.1177
Doctoral I Universities	1.02	0.1207
Doctoral II Universities	0.8623	0.0957
Comprehensive I Universities	0.9377	0.0868
Research I Universities(Reference group)		
Publicly controlled Universities	1.07	0.0774
GPA		
GPA(3.25-3.74)	0.9005	0.0742

GPA(less than 3.24)	0.8678	0.0739
GPA(3.75-4) (Reference group)		
Educational Institutions	2.09***	0.1851
Industry and Government(Reference group)		
Employer Size		
Employers with 100-1,000 employees	1.23*	0.1143
Employers with 1000-25,000 employees	0.9299	0.0809
Employers with more than 25,000 employees	0.8031*	0.0877
Employers with Less than 100 employees (reference group)		
Region of residence		
Midwest	0.9483	0.1026
South	1.04	0.0883
West	1.12	0.1106
Northeast(reference group)		
Supervisors	0.9246	0.0679
Not Supervisors(reference group)		
Job tenure	1.01	0.012
Year Master's Degree Awarded		
2000	1.31*	0.1532
2001	1.15	0.1768
2002	1.32	0.2012
2003	1.14	0.1662
2004	1.25	0.1824
2005	1.004	0.1315
2006	1.05	0.1341
2007	0.893	0.1229
2008	1.15	0.1631
2009	1.26	0.1698
1999(reference group)		

*p<.05;**p<.01;*** p<.001(two-tailed tests)

Appendix 2. Estimated Effects of Demographic, Educational and Job Market Characteristics on Log Annual Earnings of Master's Recipients

Variables	Coefficients	S.E.
IMR	-.0609*	0.0234
Demographic Variables		
Age	.0346***	0.009
Age Squared	-.0003**	0.0001
Male	.0529**	.0155
First Generation students	-0.0232	0.0188
Married	0.0643***	0.0136
Having at least one child	0.05*	0.022
Race/Ethnicity		
Asian	0.0253	0.0222
Black	-0.0611**	0.0199
Hispanic	-0.051	0.0397
White(Reference group)		
Educational Experiences		
Field of Study		
Engineering	.3046***	0.0237
Mathematics and Computer science	0.3167***	0.0249
Psychical science, Chemistry and Physics	0.00003	0.0319
Psychology	-0.0449	0.0271
Social science	.0664**	0.0233
Health	0.2554***	0.0251
Biological and Agricultural Science(Reference group)		
Carnegie Classifications		
Research II University	-0.0257	0.0195
Doctoral I University	-0.0184	0.026
Doctoral II University	-0.0194	0.0217
Comprehensive I University	-0.0219	0.0193
Research I(Reference group)		
Public-controlled University	-0.0527**	0.0166
GPA		
GPA(3.25-3.74)	0.0065	0.0154
GPA(less than 3.24)	-0.0223	0.0183
GPA(3.75-4) (Reference group)		
Job Market Characteristics		
Educational Institutions	-0.3579***	0.0273
Industry and government(Reference group)		

Employer Size		
Employers with 100-1,000 employees	.0710***	0.0192
Employers with 1000-25,000 employees	.0997***	0.0199
Employers with more than 25,000 employees	.1464***	0.0245
Employers with Less than 100 employees(reference group)		
Region of residence		
Midwest	-.0632**	0.0232
South	-.0528*	0.0226
West	-0.008	0.024
Northeast(reference group)		
Supervisors	0.0829***	0.0136
Not Supervisors(reference group)		
Major-job match-Somewhat related	.1318***	0.0269
Major-job match-Closely related	.1547***	0.0254
Major-job match-not related(reference group)		
Job tenure	0.0021	0.0031
Year Master's Degree Awarded		
2000	-0.0336	0.0204
2001	-0.0242	0.0222
2002	-0.0467	0.0266
2003	-0.0811**	0.0261
2004	-0.1022**	0.0264
2005	-0.0758**	0.022
2006	-0.0265	0.024
2007	-0.0634*	0.0247
2008	-0.0477	0.0244
2009	-0.1652***	0.0375
1999(reference group)		

*p<.05; **p<.01;***p<.001(two-tailed tests)

Appendix 3. Estimated Effects of Demographic, Educational and Job Market Characteristics on the overall job satisfaction

Variables	Odds Ratio	S.E.
IMR	1.12	0.1537
Demographic Variables		
Age	0.9998	0.0052
Male	1.17**	0.0693
First Generation students	0.9952	0.0618
Marital Status	1.12	0.0803
Having children	0.9497	0.0701
Race/Ethnicity		
Asian	0.8317	0.1099
Black	0.729**	0.0717
Hispanic	1.11	0.0996
White(Reference group)		
Educational Experiences		
Field of Study		
Engineering	1.09	0.1033
Mathematics and Computer science	0.8504	0.0913
Physical science, Chemistry and Physics	1.26	0.1534
Psychology	1.09	0.1239
Social science	0.9866	0.1042
Health	1.04	0.1211
Biological and Agricultural Science(Reference group)		
Carnegie Classifications		
Research II	0.9972	0.0859
Doctoral I	1.13	0.136
Doctoral II	0.9409	0.0916
Comprehensive I	1.08	0.0785
Research I (Reference group)		
Public controlled Institutions	1.15*	0.0656
GPA		
GPA(3.25-3.74)	0.8941	0.066
GPA(less than 3.24)	.7955**	0.0642
GPA(3.75-4) (Reference group)		
Job Market Characteristics		
Educational Institutions	1.23**	0.0959
Industry and government(Reference group)		
Employer Size		
Employers with 100-1,000 employees	1.11	0.099

Employers with 1000-25,000 employees	1.069	0.0806
Employers with more than 25,000 employees	1.062	0.1084
Employers with Less than 100 employees(reference group)		
Region of residence		
Midwest	0.7624**	0.0787
South	0.8517*	0.0672
West	0.7833**	0.0671
Northeast(reference group)		
Supervisors	1.13	0.0745
Not Supervisors(reference group)		
Job tenure		
	0.9874	0.0098
Year Master's Degree Awarded		
2000	1.38*	0.1741
2001	2***	0.2582
2002	2.32***	0.3307
2003	3.45***	0.482
2004	4.11***	0.6286
2005	3.23***	0.4192
2006	4.45***	0.5805
2007	3.83***	0.5217
2008	2.35***	0.3224
2009	2.64***	0.3702
1999(reference group)		
Major-job match		
Somewhat related	1.91***	0.2508
Closely Related	4.08***	0.5288
Not Related(Reference group)		
Annual Earnings After Adjusting Inflation	1***	0.0000016

Numbers within parentheses are standard errors. *p<.05; **p<.01;***p<.001(two-tailed tests).