THREE ESSAYS ON THE ECONOMIC INTEGRATION OF FOREIGN-EDUCATED IMMIGRANTS: A TEST OF CLASSICAL ASSIMILATION

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
(Sociology)
in the University of Michigan
2011

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Dedicated to the memory of my grandmother, *Nainai*,
who lovingly encouraged and patiently awaited the making of a *poksu*.

ACKNOWLEDGMENTS

I am grateful for the opportunity to study under such giants in the social sciences, whose scholarship, insight and work ethic continue to inspire and humble me in the process of becoming a scholar. My foremost and greatest thanks goes to my advisor and chair, Prof. Yu Xie, who has imparted invaluable academic and professional wisdom, first as a teacher in quantitative methods in my early years of graduate studies, and later as a mentor. Yu Xie has provided thoughtful input and clear direction from the germination of a research idea to the completion of the dissertation. Without his guidance and support, I would not have made it this far in my academic pursuits.

I owe many thanks to my committee members, who have contributed immensely to the development of this dissertation. I can always count on them to ask big questions and to pick the deep recesses of my brain, for which, hopefully, I am a better thinker. Prof. Pamela Smock has encouraged me all along, sharing not only academic advice but also tips on how to navigate the professional sphere. Her confidence in my work and kind words during difficult periods of graduate school gave me much needed fuel to persevere. Prof. David Harding has painstakingly read earlier drafts of my work and provided detailed and invaluable comments. I am grateful for the wisdom that I have gleaned from him regarding the art of research – from identifying the lacuna to the framing of a compelling story – which I hope to one day successfully put into practice. Prof. John Bound's expertise and insight have challenged me to think more critically about immigration research, especially with respect to the different mechanisms and processes that induce migration, resulting in stories that are far more complex and exciting than I had previously envisioned. I have benefited incredibly from my committee's profound knowledge, dedication to social science research and commitment to mentoring a new generation of scholars.

This journey would not have been possible without the encouragement and camaraderie of my friends, who continually uplift me. I am grateful for the wonderful friendships of my cohort, at the Population Studies Center and in the Quantitative Methodology Program. It has been a great privilege studying alongside such brilliant minds, whose generosity with their time and feedback has shaped and refined my research. I would also like to thank my friends outside of the University of Michigan for adding perspective and color to my life. Despite the trials of graduate school, I have the fondest memories of Ann Arbor and my days in graduate school because of the friends who warmed my heart, sustaining me through the coldest days of winter.

Last but not least, I owe my deepest gratitude to my family. To my husband, Clement, I give my most heartfelt thanks. He, having gone through a doctoral program himself, offered the greatest support I could have asked for – empathy. I consider myself fortunate that though an engineer, he has taken an interest in my work and willingly served as a sounding board, especially since the favor is rarely reciprocated. I thank him for being my calm, for helping me find humor through it all, and for his patient and reassuring spirits. To my parents, Thomas and Sophia, I am thankful for their unwavering love and support. In writing this dissertation, I often neglected my filial duties, yet their enthusiasm for my pursuits and their investment in me remained unchanged. Quite literally, this dissertation would not have been written were it not for them, whose immigration history served as the motivation for the academic inquiry of high-skilled immigrants. I am forever indebted to them.

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INTRODUCTION

The achievement of Asian Americans in the labor market is often considered in popular culture the archetype of successful economic integration. It seems that with a strong cultural orientation toward education and hard work, Asian Americans have pulled themselves up by the bootstraps and emerged as "model minorities." Once occupying low rungs of the socioeconomic ladder, they have overcome their humble origins as low-skilled manual laborers and become white-collar professional workers. Through a strong work ethic, the acquisition of higher education and mastery of the English language, Asian Americans have been able to fill high occupational posts and attain economic equity with their white counterparts. Their dedication to education and work are considered to be paramount in their economic success and what set Asian Americans as a whole apart from other minorities groups in their quest for economic attainment. Such optimistic tales of meritocracy and American universalism that are exemplified by the model minority myth lend credible support to the classical assimilation and human capital models.

As the United States attracts more and more immigrants, the assimilation of immigrants has become a leading topic of inquiry in contemporary American society. The paradigmatic story of the initially disadvantaged immigrant who, through the acquisition of host-country skills and hard work, inches his way up the socioeconomic ladder is a cultural schema that many – immigrant or native – espouse. While this notion of a linear and upward trajectory of immigrant mobility in the classical tradition continues to hold sway, it may fail to capture the emerging patterns of modern day immigration and the social structure in which immigration occurs. The definition of

"assimilation" has evolved with the times, adapting to these new social realities. The classical definition of assimilation has been modified and re-conceptualized for a new generation. As social theory departs from a linear, life-cycle paradigm, the uni-directional and upwardly mobile path of the immigrant story may no longer hold (Rumbaut and Portes 2001). The possibility of a non-linear and even downward socioeconomic path for certain immigrant groups has invited a new repertoire of scholarly debate on immigrant adaptation. Yet findings for these various schools have been mixed, and an all encompassing, blanket understanding of the adaptation of immigrants continues to elude us.

The economic assimilation model consists of two parts: acculturation and human capital acquisition. "Assimilation" is often operationalized through the adoption of host-country practices, namely, Anglo-Saxon ways (Gordon 1964) through duration of stay in the U.S. As their tenure in the U.S. lengthens, immigrants become more "white" through the acquisition of American practices and beliefs. As immigrants assimilate, it is expected that they will experience the same life chances and outcomes as native whites. Couched in the economic assimilation model is the notion that learning "American" ways and immersing oneself in American society are necessary steps in becoming like whites in earnings. Becoming more "American," knowing how to socialize with and like Americans, and maintaining social ties with Americans are all requisite softer skills that are implied in the model. However, with the rise in multiculturalism, and the ameliorative effects of maintaining cultural practices, becoming more "white," may no longer be a tried and true means to upward mobility. This acculturation model has been criticized for its ethnocentric biases and its belief that becoming white is a superior and necessary end goal.

The second part of the classical economic assimilation model involves the human capital approach, where hard skills such as years of school and years of experience determine economic outcomes. The human capital model assumes that as immigrants' education and experience mirror those of native whites, they will have the same life chances as their white counterparts. A reason why immigrants are unable to reach

economic equity with their white counterparts is that they do not have the same human capital as native whites. The skills acquired abroad may not be compatible with the U.S. economy, therefore, not easily transferable. Skills necessary in the U.S. economy, such as English language proficiency, may not have been sufficiently taught in the foreign education system. Upon entry to the U.S., professionally-trained immigrants may lack the necessary licensure and credentials that are required of professional workers. On the demand side, because of the lack of familiarity of foreign degrees, employers may be reluctant to hire foreign-educated workers to reduce risk. As a result of such barriers, the hard skills acquired abroad may not be recognized and sufficiently utilized in the U.S. economy, leading to depressed earnings.

With the restructuring of the economy and the shift away from manufacturing to service jobs, many question the validity of the classical assimilation model. Because jobs are now polarized, many low-skilled immigrants, despite their hard work, will not be able to work their way into the middle class. Occurring simultaneously is the rise in high-skilled immigrants who are cherry-picked to work in the United States. These immigrants are highly-educated professionals and start their American experience at the top of the socioeconomic totem pole, contradicting the classical image of the hard-working and determined yet poor immigrant. Many of these immigrants are foreign-educated, do not speak English as a native language and have very little or no U.S. work experience. Yet, they are able to succeed in the labor market. Therefore, perhaps the immigrant human capital model – specifically, the "assimilation" component – is obsolete. The changing economy, coupled with the changing demographics, invites a new understanding of assimilation – what it is today, and whether it still holds. Is becoming "American" still the ultimate striving and a requirement for economic success? Or does economic parity occur independent of U.S.-acquired human capital, suggesting a decoupling of "Americanization" from economic integration?

Economic Assimilation

According to the classical assimilation perspective, assimilation is measured as "parity of life chances with natives," where opportunities and outcomes of immigrants

come to mirror those of native whites (Alba and Nee 1997: 835). Accordingly, immigrants are considered to have reached economic assimilation if they have attained average or above average socioeconomic status and equal participation in the labor market as natives. In the paradigmatic immigrant human capital equation, earnings is a function of both human capital (such as education and work experience) and acculturation (as measured by duration of stay in the U.S.). The main tenet of classical assimilation is that immigrants face an initial earnings disadvantage upon entry to the U.S., but once human capital variation is taken into account, they are able to overcome this deficit by acculturating into American society, and through which, become indistinguishable from native whites in earnings.

Classical Assimilation Perspective

For the past fifty years, the classical assimilation model has served as a foundation for understanding immigrant economic incorporation into mainstream American society. Assimilation is conceptualized as a necessary, unidirectional and irreversible process that leads to cultural homogeneity. In its early conceptions, assimilation was a desired process, in which immigrants, who were considered "inferior" would "unlearn" their old values and customs and learn the American way for acceptance into mainstream America (Warner and Srole 1945: 285). The more different these immigrants were (i.e. "Mongloids" and "Negroids"), the longer it would take them to become like their host, and the more similar they were (i.e. "Caucasoids" and the intermediary "Mediterranean Caucasoids" and "mixtures from Latin America"), the more quickly they would be assimilated into mainstream society. Races were ranked according to their perceived "deviation from dominant American culture." As immigrants shed their old cultural markers, they would inevitably become American, come to share a common culture with the host society, and as a result, experience favorable outcomes, including economic success. This formulation of assimilation was steeped deep in the ethnocentric belief of Anglo-Saxon superiority and the assumption that integration was the end goal most beneficial for and the most sought after by immigrants (Glazer 1997).

While the idea of assimilation as a melting pot was largely the consensus of early assimilation theorists, it remained ambiguous. It was not until Milton Gordon's (1964) *Assimilation in American Life* when the dimensions of assimilation were clearly specified and operationalized. Gordon's framework (as was Warner and Srole's) was consistent with the dominant ideology of the time, which believed that the less-developed (i.e. immigrants) would undergo uniform "developmental stages," and at its end point, become "developed" and "modern," or in the assimilation case, "American." This "developmental idealism" (Thornton 2005) was reflected in Gordon's belief that American society was further along in "modernization," and other parts of the world – where these immigrants were from – would undergo the same "processes of urbanization and industrialization" (Gordon 1964:3). Embedded in this system was the belief that becoming American was "good and attainable." The Gordonian conceptualization of assimilation is a seven-prong process, beginning with *acculturation* – which is considered irreversible and inevitable – where immigrants learn to adopt the "core culture" of the host country through the acquisition of white Anglo-Saxon norms and values. This stage is often the first type of assimilation experienced by immigrants and can occur independent of other forms of assimilation. For many immigrants, acculturation is indefinite. Spatial isolation or discrimination on the part of the majority may inhibit further assimilative progress, stunting their assimilation process. For those who have acculturated, however, there is no guarantee that they will successfully navigate the second dimension: structural assimilation. Acculturation differs from the other types of assimilation in that its attainment does not automatically invite subsequent stages of assimilation. Structural assimilation – and not acculturation – is considered the "keystone of the arch of assimilation" (Gordon 1964: 81), as its occurrence naturally ushers in the other types of assimilation, and with it, the inevitable erasure of ethnic markers and values. In structural assimilation, immigrants enter the "cliques, clubs and institutions of host society" and are welcomed into the social circles of the white majority. Structural assimilation is seen as a precursor to the third stage – marital assimilation, or intermarriage – as proximity and sharing the same primary context breed liking (Gordon 1964: 80). As intermarriage takes place, ethnic differences get washed

away, especially the ethnicities of descendants, leading to identificational assimilation, where immigrants and whites alike come to share a common sense of peoplehood. When ethnic differences no longer persist, prejudices and discriminatory behavior subside, and attitudinal and behavioral receptional assimilations take place. And finally, when all the previously ethnic origin groups become one large group through the aforementioned stages, power and value struggles desist, and civic assimilation is achieved.

A second dimension of assimilation – equally linear and irreversible as acculturation but in a slower manner – stems from the "straight-line" theory (Gans 1973). Whereas acculturation addresses the relinquishment of ethnic and cultural practices and beliefs, straight-line assimilation involves the changing of social structures and relationships, which, unlike acculturation, may take generations to achieve. Rooted in Warner and Srole's work, straight-line assimilation is a durational and continual form of assimilation. As first-generation immigrants adapt to life in the host country and shed parts of their old identities, the old way of life becomes diluted as it is passed down to subsequent generations. The continual dilution of old markers and affiliations with each passing generation produces a common ground for children of immigrants regardless of ethnicity. The realization of this social and cultural commonality produces a sense of homophily, which facilitates the desegregation of physical and social spaces among the various ethnicities. This generational ethnic erosion does not suggest that ethnicity disappears completely but only that it fades in strength.

Human Capital Model

The human capital model posits that differences in earnings are the result of observed and unobserved variations in human capital. The greater the investment in human capital, the greater the economic rewards. In the human capital framework, workers are rewarded based on their productive capabilities. Human capital is highly valued because it signals to employers the worker's productivity and efficiency. Upon graduation, the worker's true efficiency is unknown, so employers rely on the worker's education to estimate his productivity. As the worker matures in the work life cycle, he becomes better at his job, thereby increasing his productivity and his value as a worker.

Thus human capital investments in education, work experience and on the job training serve as a proxy for the productive capacities of the worker, and consequently, workers with more human capital garner higher wages. Differences in earnings, then, can be attributed to differential investment; when investments are on par, economic outcomes should also converge.

In the original immigrant human capital equation (Chiswick 1978), human capital is conceptualized to differ in quantity (i.e. years of education, years of work education) but not in kind (i.e. foreign- or domestic-acquired). When human capital is accounted for, it is assumed that the only source of individual-level variation that leads to disparate earnings between immigrants and natives lies in the varying degrees of acculturation. Once Americanized, immigrants are expected to reach economic parity with natives who share the same levels of human capital. However, applications of the Chiswick equation have generated inconsistent results, casting doubt on the generalizability of the model. For instance, studies have found that Asian Americans, despite matching natives in educational attainment and work experience (i.e. the human capital component) and nativity and duration of stay (i.e. the assimilation component), still suffer a wage penalty. In fact, Asian Americans have to overeducate and overwork to reach economic parity (Hirschman and Wong 1984).

Recent studies have argued for a more detailed specification of the human capital component, namely the partitioning of the educational variable into domestic and foreign sources of education (Friedberg 2000; Zeng and Xie 2004). The Chiswick specification fails to adequately explain immigrant earnings because while immigrants may nominally share the same human capital as natives, they do not actually possess the same forms of human capital. The foreign education and work experience that immigrants acquire are not equivalent to U.S.-acquired human capital. Differences in educational quality and curricula render foreign education an insufficient substitute for U.S.-based education. The way foreign firms operate may also differ from U.S. operations, which leads to a loss of productivity as foreign workers adapt (or fail to adapt) to the U.S. economy, and in turn, leads to depressed wages. Economic inequality then is not merely a function of unequal

assimilation but also of unequal U.S.-acquired human capital. By picking up host-country skills such as a U.S. degree, English language ability, and U.S. work experience, it is assumed that immigrants will become better workers, leading to higher pay and, eventually, economic parity with natives.

Foreign human capital, however, not only leads to depressed earnings because the worker is less productive but also because of its unfamiliarity to domestic employers. When employers recruit, they rely on credentials to gauge the utility of the worker. But when the true worth of the worker's credentials is not recognized, employers may forego hiring the worker to minimize uncertainty. Because of this screening process, foreign-educated immigrants face barriers in attaining adequate employment and may have to seek employment in less competitive fields where credentials are not required. As a result, immigrants face the possibility of being under-placed in jobs where educational requirements are far below their level of training, leading to job-skill mismatch in the workplace (Zhou 1993).

Asian Americans as Model Minorities

Asian Americans as a whole appear to have achieved economic assimilation in American society. Their successful assimilation into the mainstream economy has prompted scholars and journalists alike to regard Asian Americans as the poster child of the virtues of the Civil Rights Movement. In a society as this that is strongly rooted in the ideal of meritocracy, the Asian American economic story has become a popular testament to the openness of the American system, and a prime example of how a can do attitude is all that is necessary to succeed in American society. Asian Americans are lauded for their cultural orientation that encourages a strong work ethic and emphasizes the importance of education. Through hard work and education, Asian Americans have risen to high ranks and consequently have been coined as "model minorities" for others to emulate (see Takagi 1998).

Statistics support the model minority label. At the elementary and secondary education level, Asian Americans score higher than whites in standardized math scores

and are generally on par with whites in verbal scores. Asian Americans also have higher GPAs than their white counterparts, and are more likely to take advanced math and science courses. Behaviorally, Asian Americans are also less likely to be expelled or suspended, or drop out of high school. At the post-secondary level, Asian Americans are more likely than whites to apply for college admission, and the selection of schools are generally of a higher tier than their white counterparts. Likewise, Asian Americans are more likely to enroll in college than their white counterparts and more likely to enroll in tier one colleges (see Xie and Goyette 2004). Such promising descriptive statistics bolster the model minority stereotype of Asian Americans and discredit the argument that the myth was purely a media fabrication to counter the "troublesome" minority groups during the Civil Rights Movement.

However, statistics do not lend unqualified support to the model minority thesis. In terms of labor force outcomes, at first blush, Asian Americans by and large conform to the model minority stereotype. Asian Americans have higher median household income than whites; a higher percentage of Asian American foreign-born workers have higher earnings than whites and other racial groups; and a higher percentage of Asian American workers are in managerial and professional posts than non-Hispanic whites. But these model minority statistics mask the inequality between racial groups and also within. While Asian Americans enjoy high median household incomes, the income per household member for Asian Americans is lower than the income for their white counterparts, suggesting that the illusion of Asian American financial well-being is actually a product of the pooling of resources and wages within Asian American families (Kibria 1994). Asian Americans do occupy high occupational positions, which is reflected in their high earnings, but these statistics are largely driven by their long work hours, their overconcentration in science and engineering fields and their high educational attainment (Hirschman and Wong 1984; Min 1990; Xie and Goyette 2004; Kim and Sakamoto 2010). While Asian Americans have been able to shine academically, their occupational plight appears to be less optimistic, as labor force outcomes depend not only on merit and aptitude but also on interpersonal relations that are often influenced by coethnic networks and ties, racial and statistical discrimination, and stereotypes (see Xie

and Goyette 2004). Asian Americans have achieved parity in earnings, but the mechanisms toward equity are uneven.

Inequality is not only persistent between racial groups, but even within the Asian American population, there is much variation among the various ethnicities. The model minority myth oversimplifies the Asian American story into a monolithic homogeneous experience. Aggregated data indicate that Asian Americans have an economic advantage in the American economy, but when stratified by ethnicity, a different picture emerges. While Asian Americans are more likely to have higher earnings than whites, they are also more likely to live in poverty (DeNavas et al. 2009). The political climate and the threat of persecution drove many Southeast Asian immigrants out of their homeland. Since many left in haste and with little preparation, most – even those who enjoyed economic prosperity at home – ended up living in poverty in their host country and relying heavily on government assistance. Southeast Asian immigrants have lower educational levels, lower rates of labor force participation and in turn, lower earnings (Xie and Goyette 2004). Even for immigrants who came to the United States out of their own volition and on their own terms, many do not enjoy the economic success of the model minority stereotype. For immigrants with little human and financial capital, they often find themselves residing in ethnic enclaves, which continue to be a breeding ground for exploitation, long work hours, poor working conditions and low wages (Zhou 1992). The model minority myth hides the disadvantaged Asian American population living in economic distress.

The divergent economic paths of Asian American immigrants beg the question of what the mechanisms are leading to economic equity in the United States. Utilizing the classical assimilation perspective, scholars have produced mixed results. When considering nativity and other relevant human capital and immigration variables, some argue that Asian Americans earn just as much as their white counterparts (Iceland 1999; Sakamoto and Furuichi 2002), while others argue that the Asian American earnings disadvantage persists (Hirschman and Wong 1981, 1984; Barringer et al. 1990). A series of recent studies have uncovered that such conflicting findings were due to the

aggregation of source of education (Friedberg 2000; Zeng and Xie 2004). When place of education is parsed into foreign and domestic sources, nativity and race are no longer significant. This finding that place of education is the main stratifying dimension between whites and Asian Americans supports the standard immigrant human capital approach, satisfying both the human capital and assimilation components. From the human capital perspective, qualifications and skills are crucial determinants of earnings. It is obvious that U.S.-based education imparts U.S.-specific knowledge and skills that prepare students for the labor market. But U.S.-based education also "acculturates" students by exposing them to U.S. culture. As such, those who are more acculturated through the acquisition of U.S. education fare better economically than those who are less acculturated.

Historical Changes

While the classical assimilation perspective is still a popular explanation for income inequality, it appears to be losing validity in contemporary American society. The classical assimilation paradigm was largely shaped by the historical context and immigrant experiences of the time. The current immigrant population is different from the old, as is the America in which new immigrants find themselves. Because of structural- and individual-level differences, the current adaptation process and incorporation into American society have diverged from the old. Assimilation may not be the sweeping paradigm it once was, and it may no longer guarantee uniform upward mobility.

Demographic Changes: New Wave of Immigrants

For parsimony, scholars today generally classify immigrants into two waves: the pre-1965 "old" immigrants and the post-1965 "new." The classical assimilation model was built largely on the "old" immigrants of European origin. Though they are now broadly considered "white," many "white" immigrant groups too underwent an assimilation process that made their ethnicity invisible, giving them the option to become ethnic at their choosing (Waters 1990). Jews, South European and Eastern European

immigrants in particular were once considered phenotypically and culturally non-white, but through the adoption of White Anglo Saxon norms and practices, were able to erase their ethnicity and become "white." Because of the "success stories" of old immigrants, proponents of the classical assimilation model continue to stand by the tenets of the classical paradigm and believe that with time and a cultural "whitening" process, immigrants today can become indistinguishable from whites.

However, the classical assimilation model was based on a group of immigrants at a very specific point in history. Changes in the national and global political arena have painted a new reality and cast doubt on the applicability of the assimilation model today. The Immigration and Nationality Act of 1965 is often considered a pivotal moment in the history of immigration, which lifted the restrictions on Asian entry and granted unlimited family reunification visas for spouses and children of immigrants to enter the U.S. The passage of the act ushered in new demographics of the immigrant population. While there was much heterogeneity within the pre-1965 immigrants, it is often believed to pale in comparison to the diversity of the "new" immigrants (Portes and Rumbaut 2006). The old immigrants overwhelmingly came from European nations and were generally low-skilled immigrants. In contrast, the new wave is primarily of Latin and Asian origins and is diverse in terms of socioeconomic status. On one end of the spectrum are human capital immigrants who are equipped with the educational and occupational skills for professional white-collar work. Under the H-1 work visas, foreign workers of "exceptional ability" and their family have been granted entry to the United States. These well-trained, highly-skilled immigrants often come from developing nations – especially China, the Philippines, and India– with a strong emphasis in health, science and engineering fields. With the passage of the Immigration Act of 1990, which increased the number of employment-based immigrants that could enter each year, even more visas were allocated to these professional immigrants, greatly altering the socioeconomic landscape of the foreign-born population and challenging the archetypal perception of the plight of the immigrant. Many of these immigrants have come to the U.S. not because of the lack of job opportunities back home, but have been "pulled" by the demand in the U.S. labor market and the opportunities available in the U.S. Their educational

attainment and occupational skills have propelled them to a level of high socioeconomic status, bypassing the classical assimilation trajectory of gradual economic assimilation. In fact, Asian households have higher median household incomes than the native-born population, which largely reflects their heavy concentration in managerial and professional positions. Asians on the whole have a median family income that is about $9,000 higher than the population average of $50,000, with Japanese Americans and Asian Indians leading the pack at over $70,000 (Reeves and Bennett 2004).

But not all scholars agree that today's immigrants are of a higher stock and are necessarily economically mobile. In fact, some believe that immigrants today are actually of a lower stock than immigrants of old (Borjas 1994). While the highly-educated professional immigrant has come to dominate the popular perception of the new immigrant wave (see Portes and Rumbaut 2006), the "quality" of the immigrant population is disperse. Many were forced out of their countries of origin because of political upheaval and war, fleeing to the U.S. for asylum. The rise in communism and political unrest in Southeast Asia have pushed many of Vietnamese, Laotian and Cambodian origins out of Asia. The U.S., for both "political and humanitarian" reasons (Massey 1995:639), has become a likely destination for political refugees. Compared to professional immigrants who come to the U.S. with resources, refugees immigrate with very little preparation. While these immigrants – like human capital immigrants – have the right to work, because of their low educational levels, they are concentrated in low-paying low-skilled jobs. Therefore, to make ends meet, refugee families often rely on multiple sources of income and multiple earners (Kibria 1994). Unlike human capital immigrants who enjoy higher than average earnings and white collar jobs, these immigrants on the lower end of the economic spectrum share higher rates of poverty and program assistance than the foreign-born population as a whole. The immigrant population today is one that is highly bifurcated. Because of the disparate starting points and the educational, economic and political climate of the sending countries, immigrants today face disparate futures. The polarization and diversity of modern day immigrants to the United States have made the study of immigrant adaptation more complex and have rendered the uniform classical assimilation model of old overly simplistic if not obsolete.

Demographic differences aside, many also doubt the universality of the assimilation model because of the timing and flow of the two waves of immigrants. Not only are these immigrants ethnically and socioeconomically different, but their immigration patterns also differ. The immigrants of old experienced a hiatus in the inflow of their coethnics from Europe as a result of restrictions on immigration, the outbreak of World War I, the onset of the Great Depression and World War II (Massey 1995). This halt in the influx of immigrants allowed the existing immigrants to "assimilate" into American (i.e. Northwestern European) culture. Without the constant supply of new immigrants, ties to their ancestral lands weakened, slowly eroding old ways of life. Indeed, many Americans of European descent have loose ties to their countries of origin and display little of their respective ethnicities (Alba 1990). American society today is becoming ever more immigrant. Recent patterns show no signs of a decrease in immigrant flow; rather the converse appears to be true. Between the years 1990 and 2000, the foreign-born population in the U.S. increased by almost 60% (Schmidley 2003). Fresh supplies of immigrants to the United States sustain cultural practices, which detract these new immigrants from ever becoming fully "white." In this environment of constant ethnic renewal, Gordon's steps to assimilation and Park and Burgess' (Park and Burgess 1969[1921]) common historical consciousness appear to be more difficult to attain.

Structural Changes: Economic Restructuring and the New Economy

Simultaneously, with the changing demographics and flow of immigrants to the U.S. was a change in the structure of the economy, which altered the life chances of upward mobility for the new immigrants. The old immigrants became white in a historical context that is no longer extant. Specifically, the old immigrants enjoyed a period of economic growth and expansion that enabled upward mobility (Massey 1995). In the period following WWII to the early 1970s, the economy was tight, median earnings increased, economic inequality stabilized and unemployment was low (Morris and Western 1999). However, starting in the 1970s, a reversal in trend occurred: median income first stagnated then declined, and economic inequality widened. In this period of

income stagnation and economic polarization, everyone – with the exception of those at the top – lost ground, especially those at the bottom.

Both supply- and demand-side explanations have been given to the stagnation in economic growth. Supply-side arguments contend that the dire economic conditions were a result of the maturation of the Baby Boomers, female participation in the labor force, the rise in immigration, and peak in college completion facilitated by the GI Bill. As the supply of workers grew, wages at the bottom for those who had little experience were depressed. Conversely, as the supply of *educated* workers grew, the wages at the *top* were lowered, as there was a surplus of skilled workers for an economy filled with too many deskilled jobs (see Easterlin 1980). These arguments though are incomplete. The Baby Boom explanation did not coincide with historical events: 1) the peak entry of Baby Boomers occurred prior to the economic slump for the bottom end of the economy, 2) there was greater economic diversity within groups than between, and 3) income was lower for the Baby Bust workers than their Boom counterparts (Morris and Western 1999). The rise in female workers and their depressed wages is also challenged as women actually have fared better than men (Farley 1996). The role of immigrants is overstated as studies have shown that immigrants have little effect on wages, given that immigrants and natives often do not share the same labor market. Lastly, the economy of the time was one that was increasingly characterized by a high demand for educated workers, thereby calling the oversupply of college students into question.

Demand-side explanations argue that the changing structure was to be blamed for the economic decline. Since the 1970s, the American economy has undergone drastic changes. The industrial restructuring that took place supplanted the manufacturing sector with a new service economy. The decline in manufacturing jobs led to a loss of low-skill, high wage jobs that immigrants occupied as a stepping stone for upward mobility. The service sector – while providing low-skilled jobs – has short ladders, limiting advancement opportunities. Technological changes and the computerization of the industry have rendered manual labor redundant and consequently lessened the demand for manpower, further limiting job opportunities for those with little training. At the

firm-level, with the new focus on efficiency, companies have dismantled their internal labor market, which offered career advancements within the firm. The existence of an internal labor market provided on-the-job training and promotion opportunities for workers. However, the economy today is one marked by a high level of competition and credentialism, requiring workers to receive educational and occupational training on their own. Lateral moves between companies are considered more efficient, yet those with little training often lack the human capital to successfully maneuver the structure. Such structural changes at the firm level have given rise to nonstandard and contingent work and other "bad jobs" that, because of their undesirability, are often filled by the least-educated immigrant population (Kalleberg et al. 2000). At the institutional level, because of the drop in manufacturing jobs and the increasing competition both internationally and domestically, union representation has declined, further weakening the position of low-skilled workers and thwarting their chances of upward mobility. American workers also have witnessed a minimum wage freeze, which has led to the decline in value of the minimum wage. And finally, at the global level, workers today have found that many of the jobs once available to them have now been outsourced to developing nations where production and labor costs are lower. As a result of these macro-structural changes, those at the bottom, especially those with little education, have lost ground. Therefore, it is unlikely that those at the bottom of the socioeconomic ladder will experience the same type of mobility into the middle class as their predecessors.

Education is the main determinant of occupational placement and earnings in the United States (Blau and Duncan 1967; Mare 1980). The new economy has accentuated the importance of education in economic attainment. As the demand for highly-educated workers has grown, so have the returns to higher education (Levy and Murnane 1992; Katz and Murphy 1992; DiPrete and Grusky 1990). While highly-educated workers have benefited from the increase in demand, those with little education have fallen further behind. The polarized destinies of the skilled and unskilled have led scholars to remark that the current era is an era of "uneven tides" (Danziger and Gottschalk 2004: 3), where those at the top are propelled even higher, and those at the bottom have slumped. Because of the bifurcation, the current economy is one that is often likened to an

hourglass, with jobs saturated at the high and low ends, but with a middle – which has traditionally provided means for upward mobility – that is now hollow (Zhou 1997). The Knowledge Economy is one characterized by heavy computerization, a high turnover of knowledge, and continual and accelerated upgrading of skills (Powell and Snellman 2003). The manufacturing of tangible goods has been succeeded by the creation of intangible goods and knowledge, which rely heavily on the intellectual rather than physical capabilities of the workers (Shapiro and Varian 1999). With lower-level jobs being replaced by technology, the need for well-educated managerial workers to oversee production has increased. As the American economy becomes more knowledge-based, intellectual capacity is valued over manual and physical labor, resulting in a premium on college and graduate education. This lop-sided shift in the demand for highly-skilled and well-trained workers has imposed a low ceiling on low-skilled workers, many of whom are immigrants and seeking these low-rung positions as a launching pad.

The assimilation model of old was based on an economy and opportunity structure that allowed immigrants to temporarily occupy undesirable jobs and gradually move up the ladder. However, as evidenced by the changing structure of the market, assimilation as theorized by classical assimilation scholars may not lead to expected ends. The emphasis on technology and knowledge has attracted many human capital immigrants – part of the "brain flow" phenomenon – to the United States. These immigrants are likely to fare well in the current economy that values education and intellectual qualifications. In fact, American science and engineering workers are becoming increasingly foreign-trained, illuminating the labor market's reliance on an immigrant work force. For those who are "useful" to the American labor market, their economic fate is optimistic. Yet immigrants who fit the paradigmatic image of the low-skilled immigrant may find it increasingly difficult to find suitable, upwardly-mobile jobs. Because of the changing economy and the changing demographics of the immigrant population, many have questioned the applicability and utility of the classical assimilation model in capturing the adaptation of contemporary immigrants.

Contemporary Approaches

Two perspectives are especially prominent in contemporary assimilation discourse: Alba and Nee's reconceptualization of the classical assimilation and the segmented assimilation hypothesis. Rooted in and in defense of the classical assimilation tradition, the Alba and Nee reformulation asserts that with time and the acquisition of U.S.-specific capital, immigrants will become more like natives in life chances and outcomes. Acculturation and duration provide basis for commonalities and the convergence of life opportunities and outcomes. However, differing from the canonical standpoint, assimilation is no longer a uniform and upward process where subordinate minority groups become absorbed into or catches up with the superior majority group. This definition departs from the value-laden and ethnocentric notion that the White Protestant majority is the gold standard to which immigrants must strive. Rather, this new definition sees assimilation as a process of becoming similar, where the life chances of immigrants reach parity with the life chances of the "average" American (Alba and Nee 1997). Formally defined, this reformulation of assimilation is "the decline, and at its endpoint the disappearance, of an ethnic/racial distinction and the cultural and social differences that express it." (Alba and Nee 1997: 863). That is, to become more "American" is no longer synonymous with becoming White Anglo-Saxon and does not guarantee upward mobility. To become more "American" in this framework is to become more normative. Through the assimilation process and at its finality, all are expected to converge to the point of being indistinguishable.

However, with the changing economy and the educational, economic, and political diversity among the new wave of immigrants, many are doubtful that divergent groups will one day share the same life chances. While Alba and Nee admit that the assimilation patterns appear to be bimodal, with highly-educated human capital immigrants quickly assimilating, and low-skilled immigrants undergoing a slower process, their definition suggests that all immigrants – albeit at different paces – share the same destiny of similarity. But with the new heterogeneous American population, there are multiple processes of assimilation and reference groups into which immigrants

assimilate. Because of cultural and structural forces at work, these heterogeneous immigrants set off on divergent paths, leading to vastly different ends (Zhou 1997). There is no longer one group which immigrants are incorporated into, but various reference groups that immigrants assimilate into depending on their individual characteristics and their geographic and social locations. The segmented assimilation theory proposes that immigrants' personal characteristics interact with structural elements to determine their destinies in American society. As immigrants are the most polarized in terms of educational attainment – being the most *and* least educated of the American population (Rumbaut and Portes 2001) – the economic and assimilative trajectories of immigrants possessing different levels of human capital differ vastly. Those with high levels of human capital are expected to do well socioeconomically and learn mainstream values and ways. Their favorable personal characteristics interact with their context, which, because of what their human capital can "buy," is generally receptive to these immigrants, ensuring their mobility into the upper class. On the other hand, those possessing few skills and resources are unable to hold steady and favorable employment thereby blocking their socioeconomic advancement, and because of their lack of resources and geographic and social separation from mainstream society, they acculturate into the underclass. The uneven adaptive trajectories of immigrants today have called the moral overtone of the classical assimilation model into question: becoming "American" is not a guarantee for upward mobility, but in many cases, actually lead to unfavorable outcomes (Suarez-Orozco and Suarez-Orozco 1995). Regardless of whether the classical approach or segmented assimilation perspective holds, it is apparent that the understanding of "assimilation" has steered away from the Anglo-conformist view and is now "agnostic about its directions, degrees, and modalities, and ambivalent about its desirability" (Brubaker 2001: 540).

New Directions for Assimilation

With the economic and demographic changes in American society and the global economic trends, the universality of the classical economic assimilation model is under scrutiny. Scholars have debated the merits of the economic assimilation tradition through

assimilation and human capital lenses. But what is the process that most closely captures the experiences of immigrants today? Both the assimilation and human capital approaches examine immigrant adaptation into the labor market under the assumption that immigrants are lacking in certain U.S.-specific skills and once these skills are obtained, they are able to successfully assimilate into the economic structure. From the assimilation perspective, immigrants are lacking in host-country cultural, social and linguistic skills, and from the human capital perspective, immigrants lack the necessary productive capacities to be productive workers.

Assimilation theories of old do not withstand current realities. Changes in both the demographics and the economy have created a new environment in which the old assimilation paradigm cannot be replicated. The inability to recreate the Gordonian assimilation story has led to an attack of the classical assimilation model and a dismissal of its cultural and structural relevance. And as Perlmann and Waldinger (1997) note, to expect the immigrants of today to undergo the same adaptation processes is to expect history to repeat itself perfectly.

Current Investigations

The ethnocentric and value-laden classical assimilation model posits that becoming American is necessary for favorable social and economic outcomes. In response to recent demographic shifts in the immigrant population and the changing economy, the segmented assimilation perspective argues that assimilation is not uniformly beneficial. Personal characteristics interact with the social contexts in which immigrants are incorporated to jointly effect their life outcomes. For poor immigrants who are incorporated into hostile environments, retaining ethnic and cultural roots may actually be more beneficial, while assimilation may achieve the opposite effect than intended. This dissertation situates itself in the assimilation debate and suggests that at least for high SES immigrants, since they are equipped with useful skills, assimilation is not necessary for positive outcomes. High economic earnings can be attained even in the absence of "assimilation."

In light of the new demographic and economic considerations, it is important to reexamine the tenets of classical assimilation and whether the canonical literature captures the economic adaptation of immigrants. Highly-educated, professional immigrants are a key demographic departure from the immigrants of old. Their high economic status upon entry to the United States counters the thesis of the importance of assimilation in immigrant earnings. Given the new realities, sharing the same life chances and outcomes as native whites may no longer depend on a lengthy and multi-dimensional assimilation process. Becoming economically "indistinguishable" from whites, may no longer require Gordonian acculturation or Gansian duration. Rather, what is becoming increasingly crucial in the economic assimilation of immigrants are the resources they possess prior to entering the U.S. Their human capital acquired abroad, their ability to acquire adequate work, and the recognition of their foreign education by U.S. employers are all dimensions to consider in the new economy. Classical assimilation conceptualizes the main dichotomy to occur between natives and immigrants and assimilation as a process that equalizes the native and immigrant population. But equality may already be attainable prior to assimilation, rendering the acculturation dimension an overstatement. In the new economy, and with the new composition of immigrants, human capital may trump acculturation in immigrants' ability to succeed in the American economy. Human capital acquisition abroad may be a new critical juncture in the stratification of immigrants and reveal that inequality does not only occur at the stylized binary of immigrant and native, but even more so within the immigrant population.

This dissertation focuses on educated immigrants to explore the thesis that assimilation is not universally applicable to the contemporary immigrant assimilation process and that human capital may be sufficient in explaining earnings disparities between the immigrant and native populations. Sharing more "white" characteristics – be it in human capital or cultural beliefs and practices – is not necessary to attain economic parity. The Americanization process is losing explanatory strength in the utility function of immigrant workers. In the new global economy where immigrants are recruited to work in the U.S. economy, the lack of U.S.-specific human capital and cultural norms and practices may no longer uniformly lead to lower immigrant earnings.

As the main variable of interest, the terms "assimilation," "acculturation" and "becoming American" – which have been used interchangeably in this discussion – require a formal definition. The use of "assimilation" in the dissertation follows the Gordonian understanding of assimilation, where "assimilation" is the sharing of norms and practices as the native population. In the three empirical chapters of the dissertation, "assimilation" is operationalized as having U.S.-acquired education (as opposed to foreign education), which is a "norm" that is "practiced" by the native population. Instances where foreign education is able to lead to economic parity with the U.S.-educated population are considered exceptions to the classical assimilation paradigm and in support of the thesis that assimilation is not necessary for positive outcomes. Differences in "assimilation" (i.e. place of education) do not necessarily lead to differences in economic outcomes.

To examine the declining strength of assimilation in explaining the earnings gap, I ask three questions, corresponding to the three empirical chapters in this dissertation. All three questions pertain to the universality of the importance of U.S. education in securing equitable earnings. The main question is whether immigrants can achieve the same economic outcomes as their more assimilated counterparts. Or more specifically, can foreign-educated workers converge economically with U.S.-educated workers. The first question is whether foreign education is penalized in the U.S. economy. The second question asks what the role of visas is in the earnings of immigrants, and whether holding a work visa upon first entry can narrow the earnings gap between foreign and domestic educated workers. The third question considers mismatch as a possible explanation linking foreign education and earnings and whether matched foreign-educated workers still face the same economic disadvantages. The main hypothesis is that not all workers require "Americanization" (i.e. U.S. education) to reach economic parity with whites. In fact, human capital utility in the U.S. labor market is becoming an increasingly salient factor in earnings inequality.

The data for the studies come from the 2000 Census Public Use Data and the National Survey of College Graduates 2003. Per the findings of past immigration

scholars, the main determinant for the Asian-white earnings gap is place of education, where U.S.-educated Asians are able to reach earnings parity with whites. As such, the main comparison in the three empirical chapters of this dissertation focuses on differential place of education effects *within* the Asian American population. Despite the scholarly cautions against homogenizing the Asian American population, the exploration of *within*-group earnings disparities has been scant. Limiting the sample to Asian American workers allows for a systematic within-race analysis to uncover the diversity within the population. For the analyses in this dissertation, the data are restricted to 25-64 year old able-bodied full-time foreign-born Asian American male workers.

The justification for restricting the population to foreign-born Asian American workers comes from two recent studies. The first is Zeng and Xie's (2004) paper that found that once place of education is considered, race and nativity are no longer of consequence (Zeng and Xie 2004). Since the main source of earnings variation between whites and Asian Americans is conjectured to be place of education, the earnings of U.S.-educated Asian Americans are comparable to whites'. Accordingly, the comparison of U.S.-educated and foreign-educated Asian American workers should be analogous to the comparison of white and foreign-educated Asian American workers. Secondly, recent scholarship has found that economic parity with whites is still elusive to U.S.-born Asian Americans despite their U.S. education, and the only immigrant group that has been able to mirror whites in earnings are foreign-born U.S.-educated workers (Kim and Sakamoto 2010). Therefore, the sample is restricted to *foreign-born* U.S.-educated and foreign-born foreign-educated workers, where foreign-born U.S.-educated workers are considered to be a proxy for white workers.

The first empirical paper uses data from the 2000 Census Public Use Microsample for the analysis and the National Survey of College Graduates 2003 to impute place of education for Census data. This paper employs a two-part analytic strategy to explore how the place of education effect varies by ethnicity and level of education. The first part utilizes the standard human capital framework in OLS regression to investigate ethnic differences in the returns to foreign and domestic education. A separate model is run for

each ethnic group, allowing the effects of place of education to vary by ethnicity. Because of the different immigration histories and demographics of Asian immigrants, certain ethnicities may be immune to the negative effects of foreign education. More specifically, immigrants from Asian countries that have recently become suppliers of professional and technical talent may fare well in the U.S. economy.

The second part also stratifies by ethnicity, and includes a multiplicative term (place of education X level of education) to the human capital model as a means to net out origin-specific capital. Examining the relative disparities at various educational levels sheds light on whether foreign postsecondary education is "discounted." Foreign education is considered "discounted" if the gain to foreign postsecondary education is less than the gains to U.S. postsecondary education. Or alternatively, the earnings differential between foreign- and domestic *postsecondary-educated* workers is greater than the differential between foreign- and domestic- *high school-educated* workers. The main assumption is that at the high school-level, skill sets are general, and the jobs that high school graduates occupy are less rigorous, hence foreign-acquired high school-level human capital is more transferable. Thus, it is believed that foreign-educated high school graduates should experience similar earnings as their U.S.-educated counterparts. In contrast, skills acquired at the postsecondary level are specific, so foreign-acquired postsecondary-level human capital is more difficult to transfer to the U.S. economy. Accordingly, foreign educated workers may experience smaller gains to their postsecondary education than U.S.-educated workers and experience "discounted" earnings. However, given the current economic climate and the reliance on foreign human capital, it is also possible that the skills acquired abroad are so useful and favorable to the U.S. labor market that obtaining a foreign postsecondary degree leads to greater gains, or at least equal gains as obtaining a U.S. degree.

The second empirical paper uses data from the National Survey of College Graduates 2003 to investigate the role of visa type in earnings for Asian American men. The main question is whether foreign-educated work visa holders are able to attain earnings parity with U.S.-educated workers. The human capital specification is run

separately for 1) the whole sample, 2) U.S.-educated workers and foreign-educated *non-work visa holders*, and 3) U.S.-educated workers and foreign-educated *work visa holders.* The apparent negative relationship between foreign education and earnings may be accounted for by the variability between subgroups within the foreign-educated population. When the foreign-educated group is broken down by visa type, a different pattern may emerge. In this current global economy, where there is a heavy demand for foreign workers, it is plausible that workers whose utility is recognized by U.S. employers do not suffer an earnings penalty. The lower earnings of foreign-educated individuals may be driven by a larger proportion of non-work visa holders, who may suffer lower earnings because of the (real or perceived) productive deficiencies or blocked opportunities. When the foreign-educated population is broken down by visa type, the negative relationship between foreign education and earnings is expected to disappear for work visa holders.

The second human capital specification includes an interaction term of place of education and type of major (i.e. science or non-science). In our current knowledge economy where technical and professional skills are increasingly coveted, it is possible that science and engineering (S/E) workers, despite their foreign education and non-work visa, are able reach earnings convergence, or that economic privilege is only limited to these workers. If science and engineering non-work visa holders are able to attain parity, this suggests that the privilege of work visa holders is primarily through their distribution of science and engineering-trained workers. Conversely, if they are not able to reach convergence, this suggests that technical training alone is insufficient in explaining earnings, but rather, there is something about work visas – be it through direct causation (e.g. fair wages as mandated by policy) or selection (e.g. recruitment of the brightest) – that provide a buffer, or even a boost, for foreign-educated workers . For work visa holders, this interaction term sheds light on whether the earnings parity is achieved by all work visa holders or only attainable by those who have technical science and engineering skills. While this comparison between work visa and non-work visa holders does not suggest causation, it demonstrates that the mechanisms linking place of education and

earnings require an investigation of structural and individual characteristic, as the effects of place of education vary both by visa type and academic background.

The third empirical paper also examines the role of place of education on earnings, but this time, considers major-job mismatch as a possible explanation. Data come from the National Survey of College Graduates 2003 and are restricted to male workers. The first question asks whether foreign-educated workers are more likely to be mismatched. Major and occupation are coded as twenty-six corresponding groups, and mismatch is defined as majoring in a field that is different from the occupational field. Conditional logit models predict whether mismatch is more prevalent among foreign-educated workers. Because of credentialing, limited information channels and the employer's lack of recognition of foreign degrees, the foreign-educated are hypothesized to have a greater prevalence of "mismatch." First, the whole sample is considered. However, since earnings are depressed in non-science and engineering occupational fields, mismatch from a non-S/E major to any other occupational field will necessarily lead to higher earnings. Therefore, non-S/E-trained U.S.-educated workers may seek mismatch as a strategy for higher pay. For S/E-trained, a departure from their respective science and engineering major to a non-science and engineering field or even a different science and engineering field may lead to lower earnings. Thus, it is hypothesized that U.S.-educated workers have a lower incidence of mismatch. With these two considerations, separate models are run for non-S/E and S/E-trained workers.

If indeed foreign educated workers are more likely to be mismatched, the second part of the analysis fits a multiplicative human capital model with the interaction of place of education and mismatch. The interaction term tests whether foreign-educated workers who find adequate employment are able to reach economic parity with their U.S.-educated counterparts. This generates two possible results, with four different explanations. Say U.S. education and mismatch are coded 1 and 0 otherwise, one result is a positive interaction term, indicating either a greater penalty for mismatch among the foreign-educated or a smaller penalty for foreign education among the matched. The second result is a negative interaction term, indicating either a smaller penalty for

mismatch among the foreign-educated or a greater penalty for foreign education among the matched. The main assumption is that workers prefer occupations in which they utilize their training. The second assumption is that U.S.-educated workers have greater efficacy in securing favorable employment when it is outside their training. Whereas foreign-educated workers are "forced" to work in mismatched fields as a result of blocked opportunities, U.S.-educated workers often choose to work outside their respective fields to maximize their earnings. Because of the disparate motivations and causes for mismatch, foreign-educated mismatched workers should experience greater losses vis-à-vis both their matched foreign-educated counterparts and their mismatched U.S.-educated counterparts. But for those who are able to secure adequate employment through major-occupation fit, place of education should cease to matter.

The three papers of this dissertation explore exceptions to the place of education thesis. In the current economy that is heavily dependent on science and technology and equally reliant on foreign technical and professional workers, place of education is not a universal determinant for earnings. Rather, workers are able to attain economic parity in the absence of U.S. education, suggesting that human capital is more salient than U.S.-specific and U.S.-acquired skills. However, the finding of economic equity needs to be assessed with reservation, as parity is limited to a select group of workers.

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CHAPTER 2

IS FOREIGN EDUCATION DISCOUNTED?: AN EXAMINATION OF THE DIFFERENTIAL RETURNS AND RATES OF RETURNS TO POSTSECONDARY EDUCATION

Much sociological attention has been given to the topic of immigrant assimilation into the labor market (e.g. Chiswick 1978; Borjas 1994; Zeng and Xie 2004). It has been documented that immigrants suffer an initial wage penalty that decreases as they learn host-country skills. Through assimilation, immigrants are expected to at least attain parity if not surpass natives in earnings (e.g. Chiswick 1978). The materialization of the American Dream is often believed to be embodied by the Asian American population, which, by and large, has fared well in the American economy. This common perception has given rise to the popular "model minority" myth and has masked the heterogeneity within the Asian American population (Wong 1986). Studies have shown that Asian Americans have to overachieve educationally to reach socioeconomic parity with their white counterparts (Hirschman and Wong 1984). A large body of literature has been devoted to solving this paradox (e.g. Barringer et al. 1990; Poston 1994; Sakamoto et al. 2000). Findings on whether the wage gap persists after controlling for social and such human capital variables as education levels have been mixed (Wong 1982; Chiswick 1983) until recent scholarship (Zeng and Xie 2004) revisited the human capital model to explain the disadvantages Asian Americans face in the workplace by considering the source of one's education. When place of education – whether domestic or foreign – is taken into account, such variables as race and nativity are no longer statistically significant, thus marking the importance of the location of one's education.

While the paradox has been resolved, the ethnic differences of the Asian American immigrant pool and the intellectual upgrading of the economy suggest that

foreign education may not uniformly produce the same disadvantages as previously stated. On the individual level, immigrants have varied immigration histories. Depending on their countries of origin, they are equipped with disparate levels of resources that they bring to the host country, differentially affecting their life chances and outcomes. Some come as highly-trained human capital immigrants, while others arrive as refugees with limited resources. The diversity in human and financial capital that today's immigrants possess prior to and upon arrival require a careful study of the effects of place of education by ethnicity. If different ethnic groups are marked by different histories and different country-specific skills, it is reasonable to expect that stratification occurs prior to immigration and that the effects of place of education vary among ethnic groups.

At the structural level, the economy has become heavily knowledge-intensive, favoring those with specialized skills. The well-trained have pulled ahead in this economy, while the less-educated have lagged behind. At the same time, the skills required in this economy are becoming highly specific, lending fear to the possibility that foreign-educated workers are not able to transfer their skills, especially at the post-secondary level where skill sets are honed. The postsecondary education premium has risen, but with the labor market's emphasis on credentials, foreign-acquired specialized skills could be devalued, creating doubt that the economic privilege afforded to higher education is applicable to the foreign-educated as well. The changes in the economy require an examination of the transferability of foreign postsecondary education.

Because of the heterogeneity within the Asian American population – primarily due to economic, cultural and linguistic variations across the countries of origin – the transferability of foreign education may differ by origin groups. Origins that are economically and culturally similar to the U.S., though foreign, may have higher reserves of U.S.-relevant skills. Conversely, origins that are distant from the U.S. may have lower levels of transferable skills. Such origin-specific skills may differentially drive the earnings of foreign education. If so, the foreign education penalty is no longer a pure penalty, but driven by unobserved characteristics in country-specific skills. The standard

human capital approach, in which much of the immigrant earnings literature is rooted, fails to factor out these unobserved characteristics, such as the lack of English language fluency or cultural knowledge, that could have influenced the foreign education penalty. This paper provides an alternative approach – the difference-in-differences estimator – in the examination of the place of education effect. Implicit in the design of the DID estimator is that unobserved differences in origin-specific capital can be netted out, and in so doing, shed light on the actual premium conferred to U.S. education. In sum, this paper uses two estimation strategies to answer whether foreign postsecondary education is penalized in the American labor market.

Background and Significance

Economic Assimilation

Classical assimilation model argues that with time and the acquisition of host-country skills, immigrants who initially occupied the lowest rung of the socioeconomic totem pole can assimilate into mainstream white Protestant society. As these immigrants assimilate, they can climb the socioeconomic ladder and eventually reach parity with their native counterparts. Assimilation is a means by which immigrants can overcome their humble origins, and at its final point, become indistinguishable from native whites in terms of life chances and outcomes (Gordon 1964; Warner and Srole 1945; Alba and Nee 1997). This stylized portrayal of immigrant economic assimilation has immigrants facing an initial earnings disadvantage. As immigrants learn host-country specific skills and make investments in U.S. and job-related training, they gradually move upward and reach parity with, if not surpass, their native counterparts in earnings (Chiswick 1978).

In American society, Asian Americans are touted to be a success story. Census reports indicate that Asian Americans are more likely to be in management and professional positions and enjoy higher median earnings than the total population (Reeves and Bennett 2004). Asian Americans also have the highest mean ($67,734) and median household ($51,908) incomes and have more than $10,000 more in each category than the next racial group (i.e., white) (Welniak and Posey 2005). Scholarly research has

substantiated the rosy picture by noting the decline of the negative effect of the Asian race on earnings in the second half of the 20th century (Wong 1982; Sakamoto et al. 2000), and the high educational attainment of Asian Americans despite societal discrimination (Hirschman and Wong 1986). In fact, Asians have fared so well that they are considered to be "as successful as native whites in the U.S. labor market" (Chiswick 1983:212). Such optimistic statistics and findings support the notion that Asian Americans have succeeded in American society and achieved economic assimilation.

However, despite their high earnings and occupational statuses, even with identical levels of education, Asian Americans earn less than their white counterparts (Barringer et al. 1990). To achieve economic parity with their white counterparts, Asian Americans have to "overeducate" with more years of schooling (Hirschman and Wong 1984). The lower earning power of Asian Americans in spite of high educational attainment is the crux of the Asian American earnings paradox. Scholars have attributed this paradox to overt discrimination, cultural and social psychological factors, and social capital and networks (Tang 1993; Woo 2000), but the paradox persisted. A recent study (Zeng and Xie 2004) resolved this longstanding puzzle by differentiating education into foreign-obtained and U.S.-obtained education. Once the source of education is partitioned into domestic and foreign, race and nativity no longer have significant effects on earnings, suggesting that foreign education is the primary source of economic disadvantage between Asian and white workers.

Supply- and Demand-Side Changes

With the finding of economic parity when place of education is factored in, the Asian American population presents a likely case for the classical assimilation model. But even so, scholars are skeptical of the applicability of Chiswick's optimism to the post-1965 wave of immigrants (Borjas 1994). Both supply- and demand-side changes have challenged its generalizability in contemporary society.

Changing Demographics

The "new" immigrants are categorically different from and more varied than the "old," particularly in terms of country of origin and skills. A key feature of the "new" wave of immigrants is the socioeconomic diversity among the countries of origin. Since the level of development of the country of origin as measured by per capita GNP and literacy is predictive of the earnings of immigrants (Jasso and Rosenzweig 1990), the varied origins of immigrants could be an emerging source of income inequality. Countries that have more financial and educational resources could lessen or even negate the economic setbacks of foreign-educated immigrants. Not only is there economic variability across the Asian sending countries, but the political histories vary greatly as well. Asian immigrants enter the U.S. under different conditions and statuses (e.g. refugees, students, workers), which accordingly affect their life chances in the U.S. On the one hand are low-skilled workers who start so far behind and ill-equipped that it is unlikely they will ever be able to reach parity with their white counterparts. These workers – mainly from Southeast Asia and arrive as refugees – suffer from low educational attainment, lower labor force participation and in turn, depressed earnings (Xie and Goyette 2004). On the other are highly-skilled immigrants who come to the United States for higher education or professional occupations. These workers – generally from East Asia and India – for the most part, conform to the model minority paradigm and are characterized by high levels of education, overconcentration in high-end science and engineering positions, and high incomes.

While place of education accounts for the earnings differentials between whites and Asian Americans, given the heterogeneity of the Asian American population, many questions linger. Does foreign education negatively affect all within the Asian population evenly? Are there ethnic differences? To present the Asian American population as a monolithic homogenous group masks the differences within the population, and to assume that place of education matters in the same direction and magnitude for all Asian American groups is possibly misleading. If the different ethnic groups are marked by different immigration histories and different country-specific skills,

it is reasonable to expect that place of education could vary for the various Asian ethnic groups. In order to illuminate the heterogeneity between the ethnic groups, this study determines how place of education varies for different Asian ethnic groups. To observe the ethnicity-specific returns to foreign and domestic education and whether the effect of foreign education is consistent throughout, the sample is stratified by ethnicity.

The Transferability of Foreign Human Capital in the New Knowledge Economy

The classical assimilation model was built on the "old" European immigrants who entered the United States under a different economic regime. In the old economy, immigrants largely occupied the manual labor sector upon entry and gradually worked their way up as they assimilated into American society. However, starting in the late 20th century, with the decline in manufacturing and shift to the service sector, many opportunities for upward mobility disappeared. The process of deindustrialization hollowed out jobs in the middle and created a new "hourglass" economy that is heavily concentrated at both the top and the bottom (Zhou 1997). The so called "knowledge" economy is one marked by a strong reliance on intellectual capacity, a high premium on college education, heavy computerization, and a quick turnover of knowledge (Powell and Snellman 2004). This economic shift away from labor-intensive jobs and the increasing value of higher education have rendered it difficult for immigrants who start out at the bottom of the ladder to "make it" in American society. In fact, as a result of this shift, the wage inequality between those with high educational attainment and those without has widened.

Little is known about the *transferability* of foreign education at different educational levels. In the new knowledge-intensive economy that is heavily reliant on the intellectual capacity of workers, foreign-educated college workers may have a stronger buffer against the penalties of foreign education than their less-educated counterparts. Or because of the new economy's dependence on highly technical and specific skills and the emphasis placed on credentials, foreign-educated workers may actually suffer a more pronounced penalty for their foreign education than U.S. postsecondary-educated

workers as a result of the lack recognition and transferability of their human capital. Foreign postsecondary-educated workers could either pull ahead the same way as their U.S.-educated counterparts or suffer from a slower rate of wage growth (i.e. discount) for their foreign credentials.

The human capital function has wages starting off low for less-educated workers and experiencing quadratic growth as education increases. But the relative shapes of the functions for U.S. and foreign-educated workers have not been studied. Three patterns are possible. First, the distance between the foreign-educated and domestic-educated human capital curves follow the same pattern (see Figure 1a), meaning that the growth in wages are the same, and while foreign education in general may generate less returns, there is no additional advantage or disadvantage to a foreign postsecondary education. This occurs under the condition where high school and postsecondary education have equal transferability in the U.S. labor market, and the disadvantage is constant across levels of education. The utility of foreign education is the same as the utility of U.S. education, and the two sources of education are perfect substitutes of each other. From a meritocratic perspective, the American labor market rewards those according to their productive capacities, regardless of their source of education.

The second possibility is that the foreign-educated curve rises faster than the U.S.-educated curve and the inequality between educational levels is greater for foreign-educated than domestic (i.e., "foreign postsecondary education premium") (see Figure 1b). In the current economy that values higher education and is reliant on professional foreign labor, the gain in earnings from foreign high school to foreign postsecondary education could be greater than the gain for U.S. education, resulting in a steeper foreign education curve. Consistent with the brain drain phenomenon, foreign human capital workers are recruited to work in the U.S. Their recruitment suggests that these workers are a highly select group of workers who possess exceptional human capital. These workers have skills that are in shortage in the United States, and because of their highly coveted skills, they are rewarded accordingly and receive a wage premium for their foreign education. In this case, at the postsecondary level, the difference in earnings is

smaller between foreign and U.S. college-educated workers than high school-educated workers.

The third possibility is that the growth of the curve is flatter for foreign-educated than for the domestic educated (i.e. “foreign postsecondary education discount”) (see Figure 1c). In this scenario, the wage premium for postsecondary education is lower for foreign-educated than U.S.-educated workers, signaling less inequality between high school and postsecondary education among the foreign-educated. Conversely, this indicates that foreign-educated workers suffer a discount for their postsecondary education, and accordingly there is *more inequality* between foreign and domestic postsecondary-educated workers than high school-educated workers. From the cumulative advantage perspective where privilege accumulates and grows temporally (see DiPrete and Eirich 2006), U.S. education and postsecondary education are two sources of “advantage” that accrue compounding benefits. Therefore, U.S. postsecondary education leads to higher rates of economic returns than foreign postsecondary education, creating a foreign postsecondary education discount.

To draw these conclusions of transferability, a few assumptions are necessary. High school education is generally perceived as an institution for common knowledge and general skills and to equip students for postsecondary education. Technical and specialized skills are assumed to be acquired at the postsecondary level, where students are primed for skilled professional job opportunities. Because of the wide applicability of the general skills acquired in secondary education, they are more aptly transferable, leading to smaller wage differentials between the U.S. and foreign-educated workers at lower educational levels. To test whether foreign-educated workers encounter a postsecondary premium or discount, an interaction of place of education and level of education (i.e., DID estimator) is included.

Data and Methods

The main research aim is to uncover the earnings penalty associated with foreign education. A two-step strategy is employed. The first strategy, in the additive human

capital framework using OLS regression, estimates the *raw* foreign education penalty. At any educational level, if a difference is observed, and the foreign-educated have lower earnings, the difference is labeled a foreign education penalty. However, the *raw* penalty in the additive framework does not take into account unobserved differences in human capital across origins that could potentially be contributing to the observed penalty. To net out such differences, the second step addresses the *relative* penalty for foreign education by using the difference-in-differences approach, which is analogous to an interaction of place of education and level of education. Both steps stratify the sample by ethnicity for variations among subgroups.

Data

Data primarily come from the 2000 Census Public Use Mircrosample 5% file. PUMS is an ideal dataset for studying immigrant earnings because of its large sample size and its national representativeness of all sectors of the labor market. The 2000 survey was the first time the Census allowed respondents to indicate multiple races. The sample is restricted to those who identified solely as Asian. The analytical sample consists of foreign-born[1], not disabled, Asian Americans male workers between the ages of 25-64 who worked at least 35 hours per week and at least 45 weeks per year in 1999[2]. For the additive human capital model, only postsecondary-educated workers are included to examine the foreign education penalty for postsecondary education. These restrictions yield a sample of 46,665 postsecondary-educated workers. For the difference-in-differences analysis, high school-educated workers are included as baseline reference, yielding an analytical sample of 56,060 total workers.

[1] The data are limited to foreign-born workers. A recent study found that foreign-born US-educated workers are able to reach economic parity with whites, thus serving as a proxy for whites in the estimation of earnings.

[2] Data for the 2000 PUMS were collected in the year 2000. Full-time work is not a point-in time status as employment is volatile. To capture full-time work, data were collected on the respondents' 1999 work history. Also I limit the sample to full-time, year round workers because of the possibility of the selection of certain ethnic groups into non-standard work, which would depress the returns to education, especially lower levels of foreign education.

While there is no direct measure of place of education in the 2000 Census, detailed year of arrival variable[3] is available, so place of education can be inferred with a few assumptions. If it is assumed that students graduate from high school at 18, using information on age, education and year of entry to the U.S., the location of education can be predicted. For example, if a respondent entered the U.S. in 1982 at age 2 and has 12 years of schooling, it is safe to assume that all 12 years of schooling – and high school education – were acquired domestically.

Though the 2000 PUMS contains detailed information on the year of arrival, and with it, place of education can be easily inferred with a few variables, this classification technique generates a larger percentage of misclassified cases than the scheme devised by Zeng and Xie (2004), where they used the National Survey of College Graduates 1993 to predict place of education for 1990 Census data. Therefore, for levels of education that are present in the NSCG (i.e. college and above), the Zeng and Xie classification scheme is employed to impute place of education for Census data. In accordance with the Zeng and Xie technique, using the NSCG 2003, the probability of receiving U.S. education is first predicted in binary logit as a function of age, immigration year, education and ethnicity. The same specification is run for Census data, and if the probability is greater than .50, then the Census respondent is classified as having U.S. education, and foreign otherwise. The misclassification rate for this scheme is 8% for the college-educated population as opposed to 24% for the inferred scheme. The overall misclassification for the estimated technique is 16%, with the graduate-educated population experiencing a higher probability of misclassification. Since the NSCG only surveys post-secondary graduates, place of education cannot be estimated for high school graduates using the Zeng and Xie technique. Therefore, for the high school population in the Census, place of education is inferred by age, year of arrival and level of education.

[3] Prior to the 2000 Census, the exact year of arrival was not published for public use. Instead, the variable was categorized primarily into 5-year intervals.

Methods

The primary research aim is to determine the wage penalty associated with foreign education by using two different strategies to provide two interpretations of the wage penalty. The first strategy is the standard human capital model. The second takes into account the origin-specific skill differences in the population by using the difference-in-differences strategy.

Step One: Human Capital Model

The first estimation strategy controls for confounding variables by using the standard human capital approach and estimates the *raw foreign education penalty*. The basic human capital function is specified as:

$$y = \beta_o + \beta_1 POE + \beta_2 Edu + \beta_3 Exp + \beta_3 Exp^2 + \beta_4 Hours + \beta_5 Weeks + \beta_8 Region + \varepsilon \qquad (1),$$

where earnings is a function of place of education, level of education (i.e. some college, college, and advanced) experience and its square term, log of hours and weeks worked, geographic region (i.e. East, Midwest, South and West). The key coefficient of interest is B_1, which indicates the difference in economic returns to foreign and U.S. college education.

However, the foreign- and domestic-educated groups may be inherently different, and the preexisting differences between foreign- and domestic-educated workers may actually be driving the differential earnings. In other words, foreign and U.S. education may not be capturing the pure effects of obtaining the two sources of education. Workers who acquire the two sources of education may differ in unobserved skills, which cannot be captured in the standard approach. Foreign-educated workers may have origin-specific skills that are not compatible with the American economy. Because of shortages in U.S.-specific skills among the foreign-educated, what is penalized is not the actual attainment of foreign education, but the deficiencies in necessary U.S.-specific capital.

As a solution to this preexisting heterogeneity between the two groups, the difference-in-differences estimator is employed (Angrist and Krueger 1999).

Step Two: Difference-in-differences Strategy

To address these preexisting differences, an individual's potential earnings to postsecondary education needs to be compared to the same individual's potential outcome in the absence of it (Rubin 1974), otherwise the estimated wage penalty could be capturing other effects that have varying levels of usability in the American economy. It is assumed that each country has origin-specific capital, such as cultural practices, language preferences, and rigor of curriculum, that is of unequal portability. Thus, foreign education varies by country – not only in the hard skills imparted but also in cultural and social traits imbued. Accordingly, the wage penalty attached to foreign education may vary depending on the human and cultural capital inherent in each origin. The DID approach allows origin differences in skills to be differenced out. To do so, a control is needed to serve as the baseline. In this study, the high school category is used as a benchmark to net out all the unobserved country-specific factors that could otherwise be driving the lower earnings of foreign education. The main assumption is that there are differences in origin-specific skills across origins, but these origin-specific skills are invariant across educational levels. For instance, the sociolinguistic skills for the high school level are the same as the sociolinguistic skills for the postsecondary level. Each origin has a set of human, cultural and social skills that are common to the population.

In the additive human capital approach, the observed lower earnings in the foreign-educated group is often construed to be the wage penalty attached to foreign education. However, in the DID strategy, the difference between foreign and domestic education at any given educational level is compared to the difference at baseline (i.e. high school group) to net out inherent differences in country-specific capital that may contribute to the returns to each source of education. Foreign education is considered penalized only when at a given educational level, the difference between the two

locations is greater than the difference at baseline. Since this approach uses the baseline difference as benchmark, this approach yields the *relative* foreign education penalty.

The difference-in-differences estimator is created by comparing the place of education difference in earnings at the high school level with the difference at each successive level of education. To determine the wage penalty for foreign education at the college level, the first step is to subtract the potential earnings of *foreign high school-educated* workers from the earnings of *foreign college-educated,* which yields the gain in earnings for foreign college education. This step nets out unobserved characteristics in the origin-specific skills of the foreign-educated population, so the difference captures the actual gain to receiving a foreign college education. Likewise, the potential earnings of *U.S. high school-educated* workers are subtracted from *U.S. college-educated* workers to obtain the gain in earnings for U.S. college education. Again, this step ensures that U.S.-specific sociolinguistic skills that are prevalent among the U.S.-educated population are netted out so that the difference captures the gain to U.S. college education. The foreign difference is then subtracted from the U.S. difference, yielding the DID estimator (see Figure 2). Say that U.S. education is coded 1 and foreign education 0, and college education is coded 1 and high school 0. A positive DID estimator indicates that the gain to acquiring U.S. college education is greater than the gain to acquiring foreign college education, suggesting that foreign college education is penalized in the labor market. If the difference is negative, the gain to acquiring foreign education is actually greater than the gain to acquiring U.S. education, signaling that there is actually a foreign college education premium in the U.S. labor market.

To control for covariates in the regression framework, the DID estimator can be written as an interaction term. The basic model for the counterfactual framework with the DID estimator is then specified as

$$y = b_o + b_1\text{POE} + b_2\text{Edu} + b_3\text{POE*Edu} + b_4\text{Exp} + b_5\text{Exp}^2 + b_6\text{Hours} + \\ + b_7\text{Weeks} + b_8\text{Region} + \varepsilon \qquad (2),$$

where y is log of earnings, POE is place of education with 1 equaling U.S. and 0 abroad, Edu is a categorical variable with high school education, some college, college and graduate education, and b_3 is the difference-in-differences estimator. Other human capital measures include experience and its square term, log of hours and log of weeks worked. Geographic region is also controlled.

For the DID to achieve the intended purpose, a few assumptions are necessary. The DID is a special case of the fixed effects, where all intrinsic, unobservable characteristics are assumed to be washed away in the differencing of pre- and post-treatment outcomes. In other words, all preexisting origin-specific differences, such as differences in ability associated with the rigor of curriculum and language of instruction, are all accounted for in the first-step differencing, so that the second step differencing is capturing the true difference in earnings between foreign- and domestic-educated workers. This requires the assumption that any changes in the rate of growth for U.S. postsecondary-educated workers are due to U.S. education alone and not to other factors that could influence the trajectory. Other factors that could potentially lead to differential earnings are time-invariant and consequently, have already been cancelled out in the differencing. It is also necessary to assume that at the high school level, skills taught are general and non-specific, and these skills are easily transferable, as they are geared towards less rigorous, less-technical jobs which do not require specialized training. A corollary then is that specific skills are acquired at higher levels of education, resulting in increasingly limited transferability at each successive level of education.

There are limitations to the DID. To net out origin-specific differences, the DID rests on the assumption that these differences are the same across levels of education. For example, the intensity of the English language program at the high school level is assumed to be the same at the college level, rendering the origin-specific linguistic capital the same across the two levels of education. Therefore, the differencing of the high school level from the college level factors out the English language ability endemic to that specific origin group. However, if foreign high school education is typically conducted in the local language, but postsecondary education favors English as the

language of instruction, the origin-specific capital is no longer constant, thus violating the DID assumption of invariance across educational levels. In this case, the differencing strategy cannot fully net out preexisting heterogeneity in the population, thus failing to cleanly capture the effect of each source of education.

Results

Descriptive statistics are presented for each approach. The results for the human capital approach are first discussed, followed by the results from the DID strategy.

Classical Human Capital Model

Descriptive results (Table 1) show that the average log of earnings for the postsecondary-educated sample is 10.794 (~$58,000). There is considerable variation within the Asian American population, with Japanese Americans commanding the highest earnings (~$66,000), and Southeast Asians the lowest (~$39,000). The earnings pattern cannot be captured by the assimilation paradigm, as the highest earning Japanese group has among the lowest percentage of U.S.-educated workers (40%), while the Southeast Asian group has close to the highest (69%). Chinese Americans, who have the largest share of U.S.-educated workers (81%), have above average earnings but trail behind the Japanese and Asian Indians, who are both the least likely to be U.S.-educated. From these descriptive results, the human capital model is tenuous. More human capital does not monotonically lead to higher wages. In terms of education, the pattern of earnings is somewhat consistent with the human capital perspective, where the three highest earnings ethnicities – Chinese, Japanese and Indian – are also the most likely to have at least a bachelor's degree. Among these ethnicities, Asian Indians have the highest proportion of advanced education holders, which can be reflected in their high earnings. But the highest-earning Japanese group, interestingly, does not have an exceptionally high proportion of graduate-educated workers, with most of the Japanese population concentrated at the bachelor's level. On the other end of the educational spectrum, the bulk of workers in the lowest-earning Southeast Asian group only have some college education. As for experience, more experience does not translate into

higher wages. The ethnic group with the most years of experience – Filipinos – only bests Southeast Asians in earnings. Likewise, Indians, who have the least labor force experience, are among the highest earners.

The effects of place of education on earnings are first examined under the standard human capital framework in OLS regression (Table 2). Overall, the results are not surprising, as this estimation strategy essentially replicates previous studies (i.e. Zeng and Xie 2004). In the pooled sample, as expected, the U.S.-educated have higher earnings than the foreign-educated. In the stratified samples, the foreign education penalty thesis holds, with the exception of Japanese workers who actually have a foreign education premium. This Japanese exceptionalism is not new, as past studies have repeatedly demonstrated the high earnings of Japanese Americans (Chiswick 1983; Iceland 1999; Xie and Goyette 2004; Zeng and Xie 2004). For all other ethnic groups, a foreign education penalty exists. Indians and Southeast Asians experience the smallest foreign education penalty; U.S.-educated Indian and Southeast Asian workers earn 16% and 18% more than their foreign-educated counterparts respectively. Chinese Americans experience the greatest foreign education penalty, with the U.S.-educated experiencing a 30% increase in earnings. For all other ethnic groups, U.S. education is associated with around a 25% increase in earnings. From the standard human capital approach, though of varying magnitudes, it appears that foreign education does indeed lead to depressed earnings.

Step Two: Difference-in-Differences

Descriptive statistics in Table 3 present the mean log of earnings by place of education and level of education for each ethnic group. The second step of the analysis adds high school-educated workers to the sample, which serve as the benchmark for country-specific skills. In the difference-in-differences framework, the intuition is to compare the differences in earnings between the two sources of earnings at the high-school level and a postsecondary level (i.e. some college, college, advanced). At baseline, it is assumed that there is no U.S. education premium; the observed difference

merely reflects the difference in unobserved characteristics – in this case, origin-specific capital – between those who receive foreign education and those who receive U.S. education.

The descriptive results indicate that at baseline (i.e. high school-educated), the foreign-educated group has lower earnings than the U.S.-educated group, with the exception of Japanese and Korean workers. For those with some college education, foreign-educated Japanese and Korean Americans have higher mean earnings than their U.S.-educated counterparts, and for educational levels college and above, only Japanese foreign-educated workers have higher earnings than their U.S.-educated counterparts, consistent with the human capital findings in Table 2.

The key comparison of interest is the difference in gains in earnings between the respective postsecondary educational levels and the high school-level for the two sources of education. For instance, in Column 6, the gain to receiving foreign college education for the whole sample (.581) is greater than the gain to receiving U.S. college education (.569), suggesting that net of origin-specific differences, there may actually be a foreign education premium. However, by and large, U.S.-educated workers reap greater gains to their U.S.-based education than foreign-educated workers at most levels of education. At the some college level, the difference between the foreign-educated (0.232) and the U.S.-educated (0.237) is small, yielding a 2% U.S. education premium, but at the advanced education level, the difference is greater, with the U.S.-educated experiencing a 16% premium for their education.

While on the whole, it appears that the foreign education penalty holds, there is considerable variation across origin groups and educational levels. At some educational levels, and for some origin groups, the gain to foreign education exceeds the gain to U.S. education, suggesting a foreign education premium. At higher levels of education, however, the foreign education penalty is uniform across the board, as U.S.-educated workers consistently have greater gains to their advanced education than their foreign-educated counterparts. The inability of foreign-educated workers to make the same gains

to their advanced education sheds light on the unequal transferability of foreign education at different levels of education. It appears that the assumption of the greater cross-cultural fluidity at lower levels of education holds. As skill sets become more specific at higher levels of education, foreign-acquired education becomes increasingly difficult to transfer, resulting in its devaluation.

The results in Table 4 show the adjusted results for log of earnings. Since the double-differencing strategy above is essentially an interaction term of place of education and level of education, the variable of interest here is the interaction term. In the full sample, the positive DID estimator for some college suggests that the gain in earnings is greater to acquiring a U.S. college education than foreign college education. The negative DID estimator for college suggest the opposite: that the gain in earnings is greater for foreign education. However, the two interaction terms are not significant, implying that the wage penalty at lower levels of postsecondary education is merely due to country-specific capital between the foreign- and U.S.-educated. The lack of significance also suggests that foreign education is not devalued, hence transferable to the U.S. labor market. However, for advanced education, the significant positive DID indicates that foreign graduate education is not able to make the same gains as U.S. education, therefore, is penalized in the U.S. context. The wage penalty that is often reported in social science research appears to hold only for graduate education. As educational levels become more specific, the capital acquired becomes less readily transferable to a different context. Workers who hold graduate-level education suffer significant economic setbacks if their knowledge and skills are acquired abroad (Figure 1c).

When the sample is broken down into ethnicities, a similar story emerges. At the some college-level, foreign education is just as valuable as U.S. education. The one exception is for Japanese workers who received some college education; these workers actually suffer a foreign education penalty. Among college-educated workers, the transferability of their foreign education varies across origin groups. For Chinese, Korean and Southeast Asians, the gain to U.S. college education is greater than the gain to foreign college education; for Filipino, Japanese and Other workers, there is no difference

in gains. For Indians, there is actually a premium to their foreign college education. At the graduate-level, however, foreign education is universally penalized.

The ethnic differences in the wage penalty for Asian immigrants suggest that foreign college education is not universally disadvantaged. From the difference-in-differences results, it appears that the lack of transferability is not a sweeping issue. Assuming that high school education is completely transferable, the difference-in-differences findings indicate that for the foreign-educated, some ethnic groups are able to reap equal gains to their college education as U.S.-educated men. As the Asian immigrant population is one characterized by heterogeneity, likewise, the returns to foreign education and the discount to their college education are also marked with considerable variation.

Sensitivity Analysis

A possible reason for the observed relative gains in foreign education could be due to the selection of foreign high-school educated immigrants. The baseline group could be a select group of extremely low-skilled foreign immigrants that lacks both the necessary credentials and skills to compete in the American labor market. The two pre-treatment groups might not be on equal footing, with the foreign-educated workers lagging behind. The main assumption for the multiplicative framework is that foreign high school-educated workers are able to successfully transfer their skills to the U.S. labor market. However, if the foreign high school-educated group is negatively biased in ability, then the reported gains for foreign postsecondary-educated Asian immigrants might not actually reflect the effect of foreign postsecondary education. Rather, it reflects the effect in addition to the wage penalty for foreign high school education, resulting in a greater leap in earnings than their domestic-educated counterparts. The relative gains could result from the deflation of the earnings of the foreign high school-educated group. To account for the possible selection of the foreign high school-educated group, a sensitivity analysis that restricts the foreign high school-educated

group only to those who have strong English language ability (i.e. those who speak English "well" or "very well") is performed.

The results to the sensitivity analysis are shown in Table 5. By and large, Asian Americans do suffer from discounted earnings for their foreign education, even at lower levels of education. Previously (Table 4), foreign-educated workers with some college- and college-level education were able to make equal gains to their education as their U.S.-educated counterparts. However, the significant positive coefficients in the sensitivity analysis indicate that netting out possible country-specific capital, foreign-educated workers are unable to make similar gains to their post-secondary education as U.S.-educated workers. When broken down by ethnicity, some of the previous findings hold. For Filipino, Indian, and Other Asians, foreign some college is still comparable to U.S. some college. At the college-level, the previous finding of an Indian college education premium disappears, though the DID is still insignificant, suggesting that there is no wage penalty for college education acquired in India. For Filipino, Japanese and Other Asians, the lack of significance of the DID persists, indicating that for these workers, college education abroad is able to make the same economic gains as domestic education. When the stock of the high-school sample is upgraded to those of higher "ability," noticeable foreign college education penalties emerge at the some college level. At the college level, the premium previously witnessed in the Indian population disappears. While the results in the sensitivity analysis paint a less optimistic story, the foreign education penalty thesis as modeled in the standard human capital framework appears to be overstated, as foreign education is not uniformly discounted across ethnic groups. Some ethnic groups – most notably, Filipino, Japanese, Indian and Other Asians – are able to make the same gains to their foreign education as their U.S.-educated counterparts.

Discussion and Conclusion

Studies on the earnings disadvantage of Asian Americans have largely agreed on the wage penalty attached to foreign education using the standard human capital

framework. However, the human capital framework suffers from omitted variable bias. Unobserved characteristics exist between the foreign- and U.S.-educated populations that may influence the wage gap. Therefore, the foreign wage penalty not only captures the difference in earnings between foreign and domestic education but also differences in unobserved skills that may also lead to economic inequality. It has been speculated that foreign education is penalized because it does not impart U.S.-specific capital, such as linguistic capabilities and cultural practices. These differences in origin-specific capital may also have an effect on earnings; therefore to capture the foreign education penalty, these origin-specific skills need to be controlled. A solution to the omitted variable bias is to employ the difference-an-differences strategy, which as a special case of the fixed effects, can net out such origin-specific capital.

Another common practice in the study of immigrant earnings is to assume homogeneity across the Asian ethnicities. Stratifying the sample by ethnicity illuminates the variations within the population and suggests that the foreign education penalty thesis is too strong. Stratification in the earnings of Asian Americans does not occur solely at the juncture of foreign or domestic education. The ethnic variation in the returns to foreign education suggests that a dimension that requires consideration is at the level of sending country.

From the standard human capital findings, the argument that domestic source of education is associated with higher earnings is confirmed. With the exception of Japanese immigrants, U.S. education confers economic benefits across the board. The high earnings of Japanese American men can be attributed to the mechanism in which they are "selected" to come to the U.S. Japanese multinationals routinely dispatch Japanese supervisors and managers to their U.S. locations for temporary posts. Because these workers generally occupy high status jobs, and because they are insulated from the American labor market, they do not suffer from the same foreign education disadvantages as their U.S.-educated counterparts.

The results from the difference-in-differences strategy, however, find anomalies to the U.S. education premium thesis. When the origin-specific heterogeneity in skills is factored out through the DID, foreign education is not uniformly discounted. At lower levels of education, foreign-educated men are able to successfully transfer their foreign education to the U.S. context. At the college level, Filipino, Japanese and Other Asians do not suffer a significant earnings penalty. At even higher levels of education, however, foreign education is evenly disadvantaged. With each successive educational level, skills and knowledge become more specific, and accordingly, the jobs that each additional educational level seeks also become more specific. As skill sets and jobs become more specialized, foreign education may be less transferable. The finding that foreign education is less transferable at higher educational levels is not surprising. The internalization of U.S. PhD holders (Bound et al. 2009), and the disproportionate representation of advanced students from Asia suggest that Asian education at higher levels may be of inferior quality. At lower levels, the quality of education may be more consistent across countries and less variable since the subject matter is still relatively basic.

In the DID strategy, one origin group that actually enjoys a foreign education premium are Indians at the college education level. From a cultural perspective, since India was once occupied by an English-speaking regime, foreign-trained Indian workers may have cultural and linguistic practices that are similar to the U.S., facilitating the transferability of foreign-acquired education. Another possibility for the higher gains to foreign college education is that structural and political changes in the U.S. economy have invited a wave of highly-skilled workers to the U.S. The American economy has become increasingly reliant on foreign workers, especially those with science and engineering skills, signaling that foreign education is not necessarily devalued. Since foreign-trained Indian workers are a leading labor supply in technical jobs, most notably in the IT sector (Lowell 2001), it is plausible that the demand for their labor has generated a premium for their foreign education. The foreign training that Indian workers receive may also be more transferable because of the universalistic property of

technical training in general (Merton 1973[1942]), and the rigor of Indian S/E training, as evidenced in their high standardized test scores (see Xie and Killewald, forthcoming).

Some origins – specifically, Filipino, Japanese, and Indians – are able to make comparable economic gains to their foreign education as their U.S.-educated counterparts, suggesting that the foreign education for these origin groups is not penalized in the labor market. A likely explanation for the transferability of their foreign education is that these immigrants have useful skills. From 1989-1992, the Philippines was the leading recipient of work visas to the U.S. during a time when the lion's share of work visas went to foreign health-related workers (Lowell 2001). Despite their foreign education, since their medical expertise was in high demand in the U.S., their foreign skills were not devalued, and as a result, led to equitable pay. The same story applies to foreign-trained Indian workers today, who are heavily recruited by U.S. employers for the high-tech industry. The Japanese story is also an employment story, but one that is insulated from the open labor market. It is common for Japanese workers to be sent to U.S. locations of the same company to fill temporary supervisory and managerial posts. Because these workers' education and performance are not judged by the U.S. economy but by the Japanese economy, they are paid according to their perceived value by Japanese employers.

In addition to being human capital immigrants, the Indian and Filipino cases may also garner higher wages for their foreign education because of their cultural and linguistic proximity to the U.S. As former colonies of English-speaking regimes, there are remnants of western culture infused in their indigenous cultures. Their social closeness to the U.S. may signal to U.S. employers that their education is comparable to U.S. education, hence requiring equity in earnings.

The story is less clear cut for the other ethnicities. The straightforward explanation is that the immigrant stock from the other origin groups is of lower quality. The foreign education received is considered inferior; the skills the immigrants acquired locally are not useful to the U.S. economy. Another possibility is that different

mechanisms are at work for the respective origins. For the Chinese population, there may be too much internal heterogeneity in the immigrant flow. Some are human capital immigrants; some are kinship immigrants. Some are kin to human capital immigrants, and some are kin to migrant laborers dating back to the 1800s. Some are able to bypass traditional ports of entry; some are shuffled into the ethnic enclave. For Korean immigrants, it is possible that as a strategy for economic survival, their foreign education is intentionally not utilized in favor of self-employment in ethnic occupational niches. Therefore, the earnings inequality is not a reflection of the devaluation of their foreign education, but their selection into lower-paying occupations. Lastly, for Southeast Asians, many are refugees who fled their origins with little preparation and equipped with limited educational and economic resources. Without the luxury of mapping out their economic prospects in the U.S., many ended up working in whatever local industry (e.g. agriculture) was available to them.

The difference-in-differences strategy provides a cleaner analysis by netting out origin-specific human capital that is assumed to be driving the lower earnings of foreign-educated workers. But the DID has drawbacks – most notably, its inability to capture the different mechanisms that sort students into domestic or foreign sources of education. There are variations in the decisions to elect an educational location, and there are variations in the opportunities to elect a given location. At each place of education and level of education combination, there is much internal heterogeneity so that even within a combination, the populations within are different. For instance, those who received U.S. high school education most likely immigrated with their parents, though some might have been sent to live with relatives. At the college level, some U.S. college-educated workers migrated as a family unit at a young age and received most of their formal education in the U.S. There are some – albeit a very small population – that migrated solo after high school to receive a U.S. college education. These two populations differ significantly in terms of family resources, with the latter coming from significant economic privilege.

These issues aside, the findings herein suggest that foreign education may not be uniformly discounted. This has implications for the assimilation debate. While

assimilation seems to be the modal path to economic convergence, there are variations. Japanese and Indian workers appear to be able to pull ahead even in the absence of U.S. education, suggesting that assimilation, while helpful, is not a requisite for parity. This is especially the case for workers who have skills that are useful to the American labor market. Contrary to the thesis that the immigrant stock is of lower quality, some immigrants today may be recruited specifically for their professional skills, suggesting an *upgrade* of the immigrant pool. The segmented approach argues that economic outcomes are an interaction of environment and personal characteristics. For the poor, non-assimilation is buffer against hostile surroundings; for the rich, assimilation into mainstream is beneficial. However, here, assimilation leads to better outcomes if immigrants are lacking in skills. If skills are good and present, it appears that whether one assimilates or not bears little economic consequence.

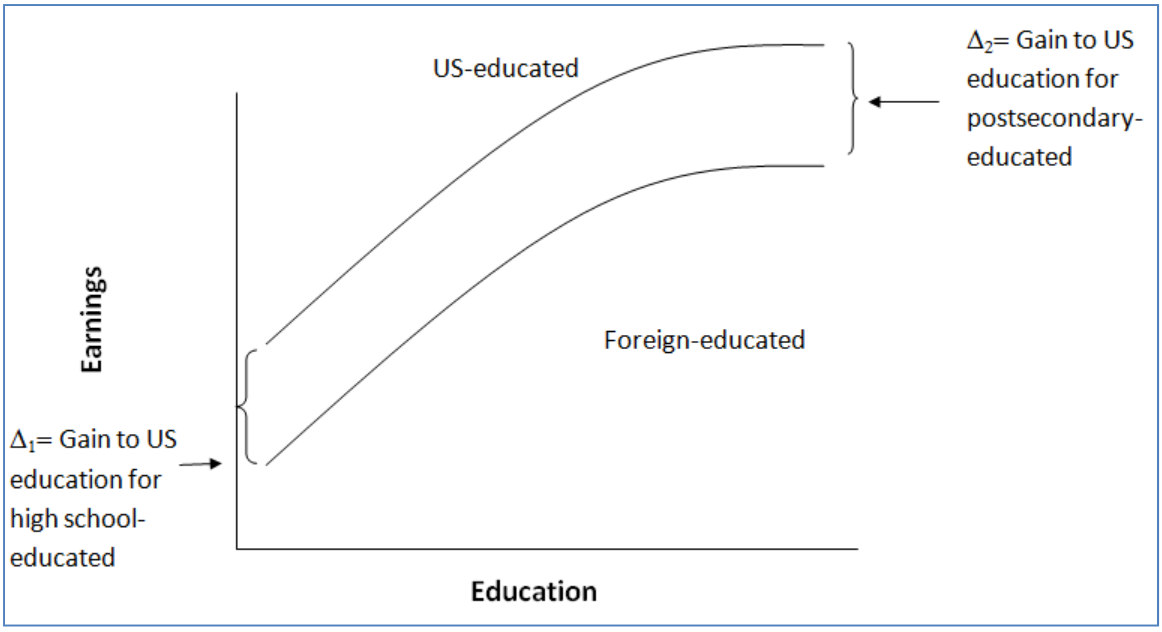

Figure 2.1a.Equality: $\Delta_1 = \Delta_2$

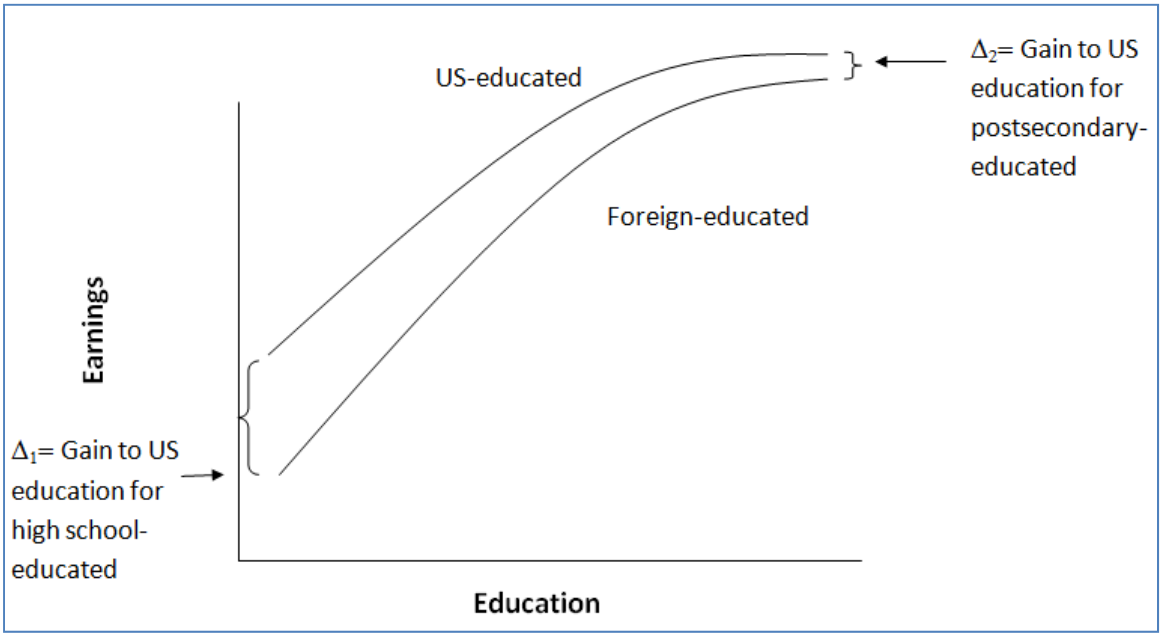

Figure 2.1b. Foreign Postsecondary Education Premium: $\Delta_1 > \Delta_2$

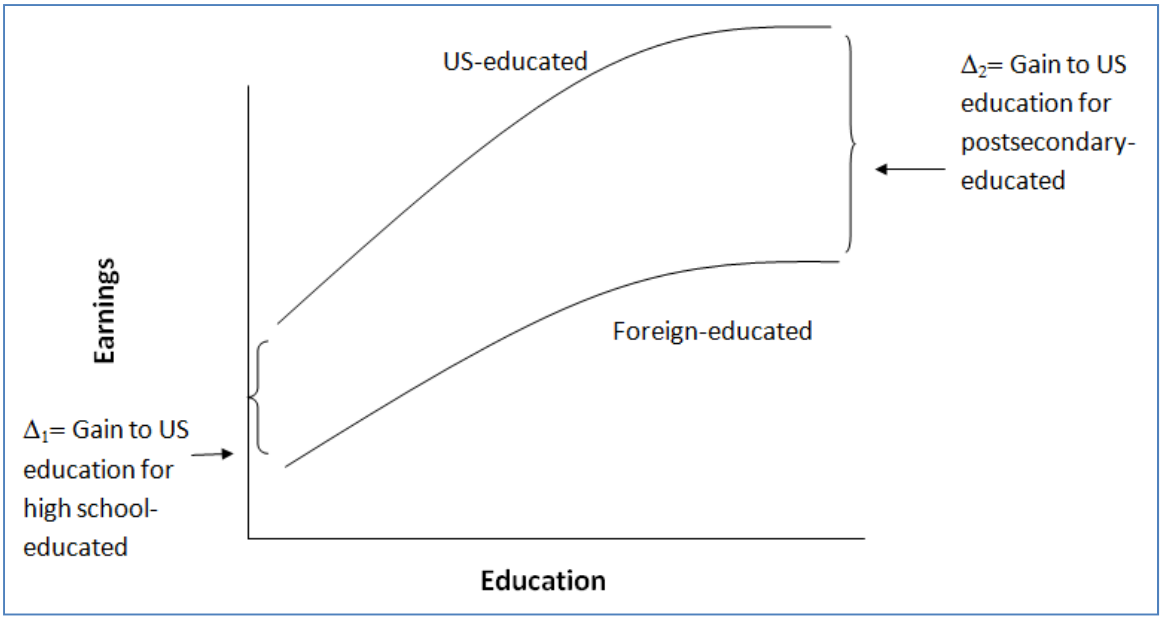

Figure 2.1c. Foreign Postsecondary Education Discount: $\Delta_1 < \Delta_2$

	Source of Education		
Education	*Foreign Education*	*U.S. Education*	**Difference**
High School	Foreign HS mean earning (FHS)	U.S. HS mean earning (USHS)	USHS-FHS
College	Foreign college mean earning (FC)	U.S. college mean earning (USC)	USC-FC
Difference	FC-FHS	USC-USHS	DID*

*DID = Difference-in-Differences = (USC - USHS) – (FC – FHS) = (USHS - FHS) – (USC - FC)

Figure 1a: Equality	FC-FHS=USC-USHS	USHS-FHS=UCS-FC
Figure 1b: Foreign Education Premium	FC-FHS>USC-USHS	USHS-FHS>UCS-FC
Figure 1c: Foreign Education Discount	FC-FHS<USC-USHS	UHS-FHS<UCS-FC

Figure 2.2. Rates of Economic Returns to Education: Difference-in-Differences

Table 2.1. Descriptive Statistics (Postsecondary-Educated Sample) (N=46,665)

	Pooled	Chinese	Filipino	Japanese	Asian Indian	Korean	Southeast Asian	Other Asian
Log of earnings	10.794	10.858	10.575	11.096	10.987	10.682	10.567	10.718
% US-educated	61.88	80.57	39.19	40.44	58.86	60.54	68.95	67.74
% Less than college	25.20	17.32	39.91	19.10	11.05	27.51	52.48	25.14
% College	37.43	29.49	49.39	52.84	34.16	43.52	33.85	36.20
% Advanced	37.36	53.19	10.70	28.05	54.79	28.96	13.67	38.66
Experience	17.410	16.989	20.500	18.606	15.087	18.735	17.661	17.041
Log of hours worked	3.802	3.794	3.757	3.852	3.812	3.875	3.778	3.824
Log of weeks worked	3.937	3.939	3.934	3.932	3.939	3.935	3.938	3.936
Region								
% Northeast	21.79	24.22	14.09	20.95	29.89	23.14	8.23	23.07
% Midwest	13.19	10.53	10.03	13.92	19.21	10.83	11.30	13.56
% South	21.76	17.83	13.94	15.83	27.29	20.01	28.67	29.91
% West	43.26	47.42	61.94	49.30	23.60	46.02	51.80	33.45
% in sample	…	24.63	17.23	4.29	26.64	9.83	11.79	5.59

Notes: Figures are weighted statistics.

Table 2.2. Estimated Coefficients from Human Capital Model in OLS Regression

	All		Chinese		Filipino		Japanese	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Place of Education								
US Education	0.145 ***	0.007	0.298 ***	0.018	0.273 ***	0.014	-0.229 ***	0.036
Level of Education								
College	0.361 ***	0.008	0.301 ***	0.018	0.301 ***	0.013	0.504 ***	0.044
Advanced	0.673 ***	0.008	0.583 ***	0.018	0.578 ***	0.021	0.603 ***	0.050
Experience								
Exp	0.034 ***	0.001	0.046 ***	0.002	0.032 ***	0.003	0.080 ***	0.007
Exp^2	-0.001 ***	0.000	-0.001 ***	0.000	-0.001 ***	0.000	-0.002 ***	0.000
Work Characteristics								
Log hour	0.322 ***	0.016	0.370 ***	0.033	0.407 ***	0.038	0.370 ***	0.085
Log week	1.060 ***	0.098	1.702 ***	0.211	1.013 ***	0.178	0.408	0.472
Region								
Midwest	-0.016	0.010	-0.100 ***	0.022	-0.043 +	0.024	-0.190 **	0.056
South	-0.069 ***	0.009	-0.090 ***	0.018	-0.110 ***	0.022	-0.269 ***	0.054
West	0.000	0.008	0.087 ***	0.015	-0.115 ***	0.017	-0.244 ***	0.043
Constant	4.623 ***	0.392	1.641 +	0.840	4.452 ***	0.707	7.088 ***	1.888
R2	18.01		19.20		18.51		19.87	
Obs	46,665		11,636		8,328		2,013	

+p<10, *p<.05, **p<.01, ***p<.001

Table 2.2. Estimated Coefficients (continued)

	Indian		Korean		Southeast		Other	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Place of Education								
US Education	0.156 ***	0.015	0.276 ***	0.027	0.183 ***	0.023	0.267 ***	0.033
Level of Education								
College	0.452 ***	0.021	0.197 ***	0.026	0.310 ***	0.018	0.193 ***	0.035
Advanced	0.747 ***	0.021	0.408 ***	0.030	0.561 ***	0.025	0.562 ***	0.037
Experience								
Exp	0.032 ***	0.002	0.040 ***	0.004	0.043 ***	0.003	0.034 ***	0.006
Exp^2	-0.001 ***	0.000	-0.001 ***	0.000	-0.001 ***	0.000	-0.001 ***	0.000
Work Characteristics								
Log hour	0.313 ***	0.032	0.089 +	0.049	0.185 ***	0.044	0.284 ***	0.065
Log week	0.359 +	0.205	0.572 +	0.331	1.994 ***	0.250	1.386 ***	0.398
Region								
Midwest	0.026	0.018	-0.019	0.039	-0.014	0.034	0.018	0.045
South	-0.032 *	0.016	-0.053	0.032	-0.006	0.029	-0.034	0.036
West	0.118 ***	0.017	-0.053 +	0.027	0.060 *	0.028	0.097 **	0.035
Constant	7.448 ***	0.817	7.357 ***	1.313	1.288	0.996	3.324 *	1.591
R2	17.10		9.26		19.43		18.19	
Obs	12,020		4,626		5,487		2,555	

+p<10, *p<.05, **p<.01, ***p<.001

Table 2.3. Mean Log of Earnings by Place of Education and Level of Education

	(1) High School	(2) Some College	(3) College	(4) Advanced	(5) SC-HS	(6) C-HS	(7) Adv-HS
Foreign Education							
All	10.140	10.372	10.721	10.917	0.232	0.581	0.777
Chinese	10.022	10.394	10.580	10.743	0.373	0.559	0.721
Filipino	10.151	10.298	10.591	10.749	0.146	0.439	0.597
Japanese	10.656	10.728	11.354	11.296	0.072	0.698	0.639
Asian Indian	10.163	10.391	10.818	11.022	0.228	0.655	0.859
Korean	10.308	10.454	10.554	10.572	0.146	0.246	0.264
Southeast Asian	10.108	10.337	10.365	10.510	0.229	0.257	0.402
Other	10.081	10.358	10.528	10.674	0.277	0.448	0.593
US Education							
All	10.212	10.449	10.781	11.126	0.237	0.569	0.915
Chinese	10.105	10.454	10.816	11.071	0.349	0.711	0.966
Filipino	10.300	10.471	10.735	11.185	0.171	0.435	0.886
Japanese	10.174	10.581	10.884	11.065	0.407	0.710	0.891
Asian Indian	10.272	10.502	10.837	11.234	0.230	0.565	0.962
Korean	10.255	10.450	10.752	10.987	0.195	0.497	0.732
Southeast Asian	10.193	10.389	10.759	10.980	0.196	0.565	0.786
Other	10.148	10.417	10.665	11.076	0.269	0.517	0.928

Note: Figures are weighted statistics. N= 56,050.

Table 2.4. Estimated Regression Coefficients with DID Estimators

	All		Chinese		Filipino		Japanese	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Place of Education								
US Education	0.116 ***	0.016	0.176 ***	0.035	0.213 ***	0.028	-0.363 **	0.108
Level of Education								
Some college	0.230 ***	0.011	0.358 ***	0.024	0.147 ***	0.022	0.116 +	0.068
College	0.611 ***	0.010	0.558 ***	0.026	0.447 ***	0.020	0.730 ***	0.055
Advanced	0.780 ***	0.016	0.750 ***	0.039	0.557 ***	0.037	0.698 ***	0.069
Interaction (DID)								
US edu x some college	0.019	0.019	-0.013	0.044	0.039	0.033	0.263 *	0.131
US edu x college	-0.019	0.018	0.176 ***	0.042	0.028	0.034	-0.027	0.119
US edu x advanced	0.169 ***	0.021	0.262 ***	0.050	0.284 ***	0.048	0.282 *	0.125
Experience								
Experience	0.033 ***	0.001	0.044 ***	0.002	0.032 ***	0.002	0.076 ***	0.006
Experience ^{2}	-0.001 ***	0.000	-0.001 ***	0.000	-0.001 ***	0.000	-0.001 ***	0.000
Work Characteristics								
Log of hours worked	0.310 ***	0.014	0.292 ***	0.029	0.412 ***	0.034	0.358 ***	0.078
Log of weeks worked	1.103 ***	0.087	1.569 ***	0.184	1.000 ***	0.159	0.219	0.438
Region								
Midwest	-0.003	0.009	-0.082 ***	0.020	-0.052 *	0.023	-0.202 ***	0.052
South	-0.046 ***	0.008	-0.060 ***	0.017	-0.103 ***	0.021	-0.279 ***	0.051
West	0.021 **	0.007	0.111 ***	0.013	-0.109 ***	0.016	-0.227 ***	0.040
Constant	4.257 ***	0.345	2.154 **	0.733	4.340 ***	0.636	7.721 ***	1.750
R^2	25.23		30.41		21.72		23.25	
Obs	56,050		13,796		9,843		2,304	

+ p<.10,*p<.05, **p<.01, ***p<.001

Table 2.4. Estimated Regression Coefficients with DID Estimators (continued)

	Indian		Korean		Southeast		Other	
	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Place of Education								
US Education	0.135 *	0.052	0.014	0.064	0.125 ***	0.024	0.141 *	0.068
Level of Education								
Some college	0.231 ***	0.030	0.136 ***	0.036	0.208 ***	0.018	0.273 ***	0.046
College	0.716 ***	0.024	0.239 ***	0.033	0.255 ***	0.044	0.449 ***	0.048
Advanced	0.858 ***	0.029	0.265 ***	0.058	0.369 ***	0.103	0.568 ***	0.069
Interaction (DID)								
US edu x some college	0.001	0.064	0.081	0.074	0.008	0.030	0.017	0.085
US edu x college	-0.115 *	0.057	0.299 ***	0.070	0.323 ***	0.050	0.085	0.080
US edu x advanced	0.161 **	0.057	0.501 ***	0.084	0.448 ***	0.107	0.378 ***	0.093
Experience								
Experience	0.033 ***	0.002	0.041 ***	0.004	0.040 ***	0.002	0.035 ***	0.005
Experience ^{2}	-0.001 ***	0.000	-0.001 ***	0.000	-0.001 ***	0.000	-0.001 ***	0.000
Work Characteristics								
Log of hours worked	0.322 ***	0.030	0.124 **	0.043	0.208 ***	0.036	0.265 ***	0.058
Log of weeks worked	0.436 *	0.192	0.768 **	0.286	1.812 ***	0.196	1.492 ***	0.349
Region								
Midwest	0.023	0.017	0.006	0.035	-0.022	0.025	0.029	0.039
South	-0.025 +	0.015	-0.013	0.028	-0.028	0.022	-0.023	0.032
West	0.110 ***	0.015	-0.009	0.024	0.022	0.021	0.103 **	0.031
Constant	6.867 ***	0.764	6.349 ***	1.133	1.774 *	0.783	2.734 *	1.393
R^2	24.51		12.69		25.00		25.49	
Obs	13,219		5,608		8,221		3,059	

+ p<.10,*p<.05, **p<.01, ***p<.001

Table 2.5. Sensitivity Analysis

	Coef	SE
All (N= 53,418)		
US Edu x Some college	0.091 ***	0.020
US Edu x College	0.053 **	0.019
US Edu x Advanced	0.241 ***	0.022
Chinese (N= 12,842)		
US Edu x Some college	0.154 **	0.047
US Edu x College	0.344 ***	0.046
US Edu x Advanced	0.428 ***	0.053
Filipino (N=9,737)		
US Edu x Some college	0.054	0.034
US Edu x College	0.043	0.035
US Edu x Advanced	0.299 ***	0.048
Japanese (N=2,210)		
US Edu x Some college	0.325 *	0.136
US Edu x College	0.036	0.124
US Edu x Advanced	0.347 **	0.130
Indian (N= 13,104)		
US Edu x Some college	0.032	0.064
US Edu x College	-0.083	0.057
US Edu x Advanced	0.192 **	0.057
Korean (N= 5,131)		
US Edu x Some college	0.189 *	0.080
US Edu x College	0.404 ***	0.076
US Edu x Advanced	0.610 ***	0.090
Southeast (N= 7,411)		
US Edu x Some college	0.064 *	0.032
US Edu x College	0.381 ***	0.051
US Edu x Advanced	0.508 ***	0.108
Other (N= 2,983)		
US Edu x Some college	0.042	0.087
US Edu x College	0.108	0.082
US Edu x Advanced	0.401 ***	0.095

+p<10, *p<.05, **p<.01, ***p<.001

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CHAPTER 3

VISA TYPE, UNIVERSALISM AND IMMIGRANT EARNINGS: A TEST OF THE CLASSICAL ASSIMILATION THEORY ON HIGH-SKILL IMMIGRANTS

The economic assimilation of immigrants into the labor market has been a much studied and debated topic in the social sciences, especially as the U.S. workforce becomes increasingly foreign-born and foreign-trained. The dominant paradigm in explaining the economic fate of immigrants is the human capital approach rooted in the classical assimilation tradition, where variations in earnings between the immigrant and native populations can be explained by differences in human capital and assimilation. For the recent wave of foreign-educated workers, it is assumed they will invariably suffer an earnings penalty in the U.S. economy compared to their U.S.-educated counterparts (Friedberg 2000; Zeng and Xie 2004). This wage disparity is largely attributed to their low levels of acculturation and the incompatibility of their foreign-acquired intellectual and cultural skills with the American economy. As foreign-trained workers assimilate by acquiring the necessary U.S.-specific capital, they are expected to increase their productive capacities and eventually reach economic parity with their U.S.-educated counterparts.

However, the classical assimilation model may prove to be tenuous for today's high-skilled human capital immigrants. Implicit in the classical assimilation model is that immigrants lack the necessary U.S.-specific human and cultural capital to find "good jobs," and therefore they are relegated to undesirable but readily accessible blue collar, manual labor. Unlike the quintessential immigrant of old – low-skilled, poorly-educated, and working in low-paying jobs – immigrants today come equipped with professional and specialized skills that are highly sought after by U.S. firms. Their exceptional skill sets

and specialized training allow them to bypass the humble starting points of immigrants of old and to find immediate economic success in American society (Zhou 1997).

A group of high-skilled immigrants that are receiving growing scholarly and lay attention are work visa holders. The issuance of H-1B visas to foreign-trained workers and their participation in the labor force muddy the classical assimilation paradigm. The demand for their specialized talent has propelled work visa immigrants to occupy high rungs of the occupational structure even upon first arrival. Their ability to attain high socioeconomic standing without undergoing the requisite 15-year assimilation process (Chiswick 1978) challenges the uniform, life cycle approach that is implicit in the classical immigrant human capital framework. For these foreign-trained immigrants who have the appropriate human capital that renders them useful workers in the U.S. economy, "becoming American" may no longer be an indispensable component in attaining economic achievement.

As high skill immigrants become increasingly prevalent and the economy's dependence on them more evident, an analysis of their economic adaptation is warranted. This paper tests the applicability of the classical assimilation perspective in explaining the economic outcomes of high-skill immigrant workers. Specifically, it analyzes variations in wages for immigrant workers who first entered the U.S. economy under different visa statuses, and how their personal characteristics interact with macro-structural factors to affect their earnings. Evidence from this study indicates that, at first blush, assimilation has waned in significance: work visas holders do appear to have an economic advantage in the U.S. labor market, reaching economic parity with their more assimilated counterparts. Upon closer examination, the advantage held by work visa holders is not consistent across human capital characteristics, suggesting that while assimilation has lost some explanatory power, it still has relevance in immigrant economic attainment.

Theoretical Perspectives

Challenges to the Classical Assimilation Perspective

The classical assimilation framework has been the dominant ideology in studying the adaptation of immigrants since the mid-twentieth century. Assimilation scholars invoke a life cycle understanding of upward mobility that consists of various progressive and irreversible stages that immigrants have to clear to become "American," and through which, to achieve economic success (Gordon 1964).The standard immigrant human capital model (Chiswick 1978) in the analysis of immigrant earnings is largely influenced by this tradition. Immigrant earnings is seen as a function of both human capital and assimilative characteristics, where all else equal, immigrants are expected to command lower wages in the labor market upon arrival because of their deficiencies in U.S.-specific sociocultural skills. While immigrants may have the same achievements (e.g. years of education), it is assumed that their training differs in quality. For instance, foreign-acquired training may not equip immigrants with U.S.-specific skills (e.g. English language) that are compatible with the existing U.S. labor market, leading to a loss of productivity, the devaluation of their skills, and in turn, lower earnings. However, their depressed economic situation is merely temporary, as immigrants can quickly learn host-country values and practices that enable them to attain economic success in mainstream society.

There is much support for the standard human capital model of immigrant adaptation. As immigrants become more like the native population, they do in fact converge economically. In Chiswick's (1978) seminal work, immigrants experience rapid economic growth and are able to "catch up" to, or even surpass, the native population with tenure in the host country. Consistent with the straight-line (Gans 1973) dimension of assimilation, which posits an intergenerational process to upward mobility, scholars have found that, by and large, third generation immigrants have earnings that are indistinguishable to the native population (Neidert and Farley 1985). Implicit in these specifications of assimilation is that with time, immigrants adopt host-country norms and practices, and in so doing, shed their immigrant identities, become absorbed into

mainstream society and come to share equal life outcomes as natives. Immigrants who have attained host country language fluency (Kossoudji 1988; Stolzenberg and Tienda1997) and acquired host country-specific training and credentials (Friedberg 2000; Zeng and Xie 2004) are able to achieve economic parity, lending much support to the classical assimilation perspective.

Recent scholarship, however, has come to recognize the inadequacies of the classical assimilation perspective to capture the pathway to economic success for today's immigrants (e.g. Portes and Zhou 1993; Borjas 1994). The conditions prior to and upon immigration and the socioeconomic diversity that characterize the immigration pool differentially impede or facilitate economic assimilation. Though broad strokes, scholars generally agree that immigration to the United States can be classified into two distinct periods: the pre-1965 "old" immigrants, and the post-1965 "new" immigrants. The landmark Immigration Act of 1965 lifted decades of restrictive immigration policies and ushered in a new wave of immigrants that is marked by considerable socioeconomic and racial diversity. While the "old" immigrants were generally considered to be of European and working-class origin, the new immigrants are overwhelmingly from Latin America and Asia. The different economic and political contexts of their countries of origin place them in varied economic positions in the American socioeconomic structure. The varied starting points afford them with differential resources and opportunities for assimilation and economic success. For instance, Southeast Asian refugees who fled their war-torn countries and Indian workers who find employment in the booming high-tech industry – though both immigrants – are equipped with different levels of human capital and come to experience very different economic outcomes. Census reports indicate that Asian Indians have the highest proportion of bachelor's degree holders (~60%). In contrast, the majority of Southeast Asians have less than a high school degree. This human capital disparity corresponds to their disparate occupational statuses in the labor market[4], as well

[4]Less than 20% of Southeast Asians have jobs in professional, managerial jobs. Close to 60% of Indian workers hold professional white-collar jobs.

as their earnings potential (Reeves and Bennett 2004). The median earning for Indian men at $50,000 is double that of the lowest-paid Hmong population.

Not only are immigrants today too diverse to be encapsulated by a single mode of incorporation, the context that receives immigrants has also changed. The classical assimilation model was largely based on low-skilled immigrants who started out in the American economy in working class, menial jobs. Through the once extant and plentiful mid-level jobs in the manufacturing-heavy economy, immigrants would gradually acquire new host-country skills and inch their way up the socioeconomic ladder. However, starting in the mid-1970s, the American economy experienced a shift from a labor-intensive, manufacturing-based economy that consisted of a spectrum of jobs dispersed throughout the occupational ladder to a bifurcated economy where jobs are concentrated at both extremes. The high-end of the economy is now characterized by a knowledge-based sector that places a premium on higher education and specialized, professional skills. Because of the quick turnover in knowledge and the need to quickly acclimate to the changing technology, the labor market seeks out workers with strong cognitive skills and intellectual capabilities. At the bottom end of the economy are jobs in the service sector that have short career ladders and require little training. But for immigrants who have limited human capital, these jobs are often the only ones available, as job qualifications are minimal, and the bar for entry is low. In the new bifurcated economy, where the ladder is absent, full economic assimilation has become elusive to those who are at the bottom of the socioeconomic ladder. Conversely, for those with skills and already occupy the high rungs of the occupational ladder, assimilation may be unnecessary. This "hourglass" economy has created divergent economic fates for the high- and low-skilled, with the former pulling further ahead, and the latter lagging even further behind (Bound and Johnson 1992; Danziger and Gottschalk 2004).

High-Skill Immigrants and Work Visas

The image of the low-skilled destitute immigrant who comes to the United States seeking the American Dream is a schema found in both scholarly and popular rhetoric. There has been extensive social science research concerning the economic adaptation of

low-skilled immigrants. Statistics indicate that the foreign-born population continues to fall behind economically. Census reports show that immigrants are more likely to seek employment in low-paying service occupations and to have an annual income of less than $20,000, and are less likely to earn more than $50,000 a year compared to the native-born population (Larsen 2004). The economic situation appears to be especially dire among low-skilled workers. Immigrants lacking in competitive skills are especially vulnerable in the U.S. labor market, as they are channeled into the secondary sector or ethnic enclaves (Piore 1970; Sanders and Nee 1987) where work conditions are poor, employee benefits are nonexistent and wages are low. Such workers are more likely than the native-born population to find themselves in nonstandard and contingent work arrangements that provide little stability and protection for workers (Kalleberg et al. 2000).

While the archetype of the low-skilled immigrant largely held true for the "old" wave of immigrants, the new wave also comprises highly-educated, professional immigrants who possess much coveted human capital. The growing presence of human capital immigrants who occupy high-level jobs even upon arrival is a marked departure from the assumptions of the classical assimilation model and further complicates the understanding of immigrant adaptation. As with other post-industrial, knowledge-intensive economies, the U.S. economy has become more reliant on foreign labor. In theory, though greatly contested, is the existence of a shortage of workers in certain occupational niches. Such shortages in the domestic labor supply to fill technical professional posts in the U.S. labor market have compelled the recruitment of foreign-born, foreign-trained immigrants. Real shortages or not, U.S. immigration policy reflects the growing dependence on and demand for foreign-trained labor. The Immigration Act of 1990 expanded the allotment of work-related immigrants by doubling the number of employment-based visas. The popularity of foreign-trained workers is also evident in the growth in human capital immigrants: the number of immigrants entering the U.S. holding H-1B work visas, which are issued to foreign-trained professional specialty workers, has increased steadily over the years (INS 2004).

With the rise in employment-based employment, a challenge is posed to the classical assimilation model, specifically the importance of U.S.-acquired, U.S.-specific human capital. In recent studies, place of education – whether foreign or domestic – has been found to be the crux in the estimation of immigrant earnings (Friedberg 2000; Zeng and Xie 2004). When source of education is considered, the earnings disparity between immigrants and natives can be fully explained. A possible explanation for the foreign education penalty thesis is that foreign-trained immigrants have skill sets that are not transferable to the labor market. Because of the differences in curricula as well as sociocultural practices, foreign-acquired training and credentials are not fully congruent with the American economic system. As a result, immigrants experience decreased productivity or suffer from underemployment, leading to depressed earnings. Given the demand for human capital immigrant labor in today's economy, there are reasons to believe that work visa immigrants are different from the general immigrant pool, and despite their lack of U.S.-specific training, may not suffer the same economic fate as other foreign-trained immigrants.

Firstly, from the causation perspective, work visas give immigrants legal status to reside in the United States (albeit often only temporarily) and the right to work, thus simultaneously giving employees leverage and deterring employers from undercutting wages. In fact, employment-based visas require employers to pay prevailing wages, guaranteeing economic convergence with U.S.-trained workers. From the selection perspective, work visa immigrants are cherry-picked to work in the U.S. labor market. Work visas act as a sorting mechanism, filtering out unqualified workers to ensure human capital compatibility, and in turn, worker productivity. If so, even immigrants with low levels of U.S.-acquired cultural and intellectual knowledge are able to attain economic convergence with a work visa on hand, further casting doubt on the necessity of assimilation in achieving upward mobility. Rather, if skill sets are vetted and validated – as measured by the possession of a work visa – economic parity is attainable even in the absence of U.S.-acquired training and U.S.-specific skills.

Science and Engineering as Universalistic

In discussions concerning the issuance of work visas to foreign-educated labor, foreign-trained science and engineering (S/E) workers generally come to mind. The story of high-skill immigration requires a special consideration of foreign-trained S/E workers, who receive the bulk of work visa allotments each year. In the current post-industrial economy, where science and technology is the primary source of national economic growth, there is a high demand for S/E workers. According to the "alarmist" view, it is believed that the American superiority in S/E has waned, as evidenced in low standardized test scores in math and science and a decline in the participation of S/E academic pursuits among native students. Whether there is indeed a decline in American S/E interest, the majority of work visas issued to immigrants today go to S/E workers, signifying the increasing reliance on foreign-born, foreign-trained workers in the American economy (see Xie and Killewald, forthcoming for review). The demand and use of foreign labor in the American economy is not new. But the immigrants of old were generally less-skilled workers occupying low-skill, manual labor jobs. In contrast, the foreign-trained S/E workers that are in high demand today possess strong skill sets and work in professional white collar occupations, thus contradicting the fundamental classical assimilation assumption of the low-skilled immigrant. Their high level of pertinent human capital garners them high occupational status upon initial arrival to the U.S., which goes against the "stylized" portrait of the initially poor immigrant who, through assimilation and hard work, gradually fulfills the American Dream of economic security.

The high demand and preference for foreign-trained S/E workers, despite their foreign education, suggests that foreign S/E human capital is portable across national boundaries. Compared to a discipline like law, where the body of knowledge imparted is specific to the locale and emphasis is placed on local sociolinguistic capabilities, S/E training is especially resilient because of its focus on technical skills that are largely consistent from context to context. Thus, the assumption of work visas as a screen for compatibility may be confounded with the type of workers that are most likely to receive

work visas (i.e. S/E workers), rendering the supposed relationship between work visas and earnings spurious.

Among the high-skill immigrants, S/E workers are a particular threat to the classical assimilation paradigm because of the ideals of their academic discipline. According to Merton (Merton 1973[1942]), science is a meritocratic and open field, governed by a set of "pre-established, objective criteria" in the hiring and evaluation of workers. Science is considered "impersonal" in that the set of fundamentals and laws that constitute science are impervious to social pressures and manipulation. It is also impersonal in that merit and performance are determined by talent alone, and not by social attributes or ascribed characteristics. Science is also open to talent. To reject workers on any grounds other than lack of talent is a detriment to the pursuit of science and biases the discovery of scientific knowledge. Because of the universalistic quality of science, the field may be more open and receptive to foreign-trained workers. Firstly, the objective nature of science suggests that scientific knowledge is constant cross-culturally. Foreign and domestic trainings impart the same lessons and tools. Secondly, as an impersonal discipline, performance is evaluated based on the skills of the workers, and not on their race, national origin or cultural proclivities. The persistent earnings disparity between immigrants and natives has often been attributed to overt discrimination, but in the realm of science, talent is the sole determinant of earnings. Lastly, the openness of science welcomes all talent, regardless of their position in the social structure.

Empirical studies have substantiated the Mertonian "imperative" of universalism. Compared to non-technical occupations, in the field of S/E, ascribed characteristics matter only in so far as they differentially affect educational attainment, but once educational attainment has been achieved, the pursuit of S/E jobs is open to all, irrespective of social background (Xie 1992). If education mediates the relationship between social origin and S/E work, and once an educational threshold is crossed, social origin becomes insignificant, it can be argued that highly-educated, foreign-trained S/E workers do not suffer a marked earnings penalty for their lack of U.S.-specific skills, given their high educational levels. In the study of immigrant earnings, the residual that

cannot be explained by human capital alone has often been attributed to cultural differences and the differential strengths of social ties (Woo 2000). But since science skills are considered objective and technical, and emphasis is placed on w*hat* the workers know – and not *who* they know – softer skills and social networks that come with "assimilation" may not be necessary for economic parity with natives. Therefore, the relationship between work visa as a screen for compatibility and predicted earnings may actually be capturing the relationship between the portability of foreign S/E training and earnings.

Asian Americans as Model Minorities

As the bulk of high skill workers – especially the bulk of *science and engineering* workers – to the Unites States today come from Asian countries, it is of particular interest to study the economic adaptation of Asian Americans. For the past twenty years or so, Asian countries have been the leading recipient of H-1B work visas. Today, India is the main source of high-skill employment-based immigrants, with the majority of the workers being fed into the fast-growing IT industry (Lowell 2001). In the 2009 fiscal year, an estimated 79,900 workers were granted legal status in the United States by employment-based visas, accounting for close to 20% of the Asian immigrants that year, compared to only 13% of the whole immigrant population (INS 2009). When only employment-based visas are considered, about 1/3 of these visas doled out to Asian Americans were given to H-1B specialty workers, whereas only 20% of the H-1B visas went to general employment-based immigrant population. Of the 190,000 H-1B visas given out that year, over half went to immigrants of Asian origin, with the next highest represented group being those of European origin and constituting only 20% of the H-1Bs.

The Asian American population is also of interest for its overall high socioeconomic standing in the U.S. labor market, garnering the label "model minorities." By and large, descriptive statistics support the claim of economic achievement. Census reports (Reeves and Bennett 2004) indicate that Asian Americans are more likely than whites to have at least a college education. A larger proportion (41%) of Asian workers is

in managerial and professional occupations, as opposed to white workers (33.4%). Likewise, around 44% of the Asian households has an income of over $75,000 a year compared to 40% of white households. On the whole, it appears that Asian Americans not only have achieved economic parity, but have in fact surpassed whites. The Asian American economic success story (Chiswick 1983) paints a likely case for the assimilation model. However, aggregate statistics are misleading. Upon closer inspection, the Asian American population is characterized by overdispersion. While Asian Americans are shown to fare well economically, they also suffer from economic hardships. Asian Americans are more likely to be represented in the service sector and also more likely to have household incomes of less than $25,000 than whites.

Empirical studies also cast doubt on the sweeping economic success that is common in public belief. Economic parity can only be achieved at the cost of "overeducation" (Hirschman and Wong 1984), meaning that Asian Americans have to attain higher levels of education to have comparable earnings as whites. The "model minority" status is also misleading in that Asian immigrants have to compensate by overworking (Min 1990) and to pool together multiple resources within the family (Kibria 1994) to reach economic convergence. The illusion of economic parity is also due to qualitative differences as well, such as the overconcentration of Asian Americans in science and engineering, where wages are traditionally higher (Xie and Goyette 2003).

The Asian American overachievement thesis has long been a paradox in the study of immigrant adaptation and substantiated by many studies (Barringer et al. 1990; Tang 1993; Iceland 1999). The paradox seemingly suggests that the American system, while claiming to be meritocratic and open, is actually discriminatory. Recent studies (Zeng and Xie 2004) have reexamined this longstanding puzzle and revealed that the missing piece of this paradox lies in the aggregation of source of education. Once place of education (i.e. U.S. or foreign) is taken into account, there is no longer a significant difference in earnings between Asian Americans and whites *ceteris paribus*. The finding of the importance of place of education diminishes the explanatory power of discrimination in the earnings of Asian Americans. It seems to suggest that differential levels of

"assimilation" are at work. U.S. education provides students with U.S.-specific capital. It affords students with the appropriate training and credentials that are required for the U.S. economy. It also imparts softer skills, such as the cultural knowhow to navigate the workplace and social networks to find adequate employment. The importance of the role of place of education seems to suggest that the primary factor standing between Asian immigrants and economic parity are variations in U.S.-specific skills.

Research Questions and Hypotheses

The overarching research aim is to consider the applicability of classical assimilation for today's immigrants. The motivation for this research stems from two complementary and nested phenomena: the rise in foreign-trained labor and specifically, the demand for foreign-trained S/E workers. The paper examines if 1) work visas as a screen for skills can bring the foreign-educated to parity with U.S.-educated workers, 2) the universalistic property of S/E training is a confounding factor in the relationship between work visa and earnings, or 3) the individual-level characteristics interact with macro-level characteristics to create different economic outcomes for different "segments" of the immigrant population.

In this analysis, three statuses are considered (see Figure 1): place of education (foreign or U.S.), work visa (work visa or non work visa) and academic discipline (S/E or non-S/E). It is assumed that U.S. education not only imparts technical skills and knowledge, but also infuses work-specific cultural capital. However, given the heavy reliance on foreign labor today, not all foreign-acquired training is entirely unusable in the American economy. As a means to sort out the utility of foreign-trained workers, work visas serve as a gatekeeper that evaluates the transferability of foreign skills and authorizes qualified foreign-trained workers to work. But not all foreign skills are created equal and have the same degrees of portability. In theory, the field of science and engineering is characterized by openness, granting equal access to all talent. The objectivity that governs the field has less of a need for U.S.-specific sociocultural skills, lessening the negative role of foreign education.

Place of Education: A Test of Classical Assimilation

The consensus among immigration scholars is that foreign education is disadvantaged. This finding falls squarely in line with the classical assimilation paradigm that predicts earnings as a function of human capital and degree of assimilation. Implicit in this argument is that foreign education is not transferable due to real or perceived deficiencies in the quality of education. In addition to teaching objective skills to students, U.S.-based education also disseminates U.S.-specific sociolinguistic and cultural skills. Because of shortages in location-specific capital, foreign training is devalued in the American economy and believed to block workers from fully maximizing their productive capacities.

Classical assimilation theorists and their opponents both acknowledge that the process of economic adaptation is now bimodal, with the privileged and the underprivileged experiencing vastly divergent economic trajectories (Portes and Zhou 1993; Alba and Nee 1997). The increasing presence of foreign-trained human capital immigrants poses a challenge to the classical assimilation thesis. Upon arrival, the "haves" are equipped with the necessary knowledge and resources to situate themselves in high socioeconomic standing, thus contesting the necessity of acculturation and the inevitability of rapid economic growth with acculturation. The plurality of the current immigrant population suggests that there different modes of incorporation depending on immigrants' personal characteristics, and the respective structural environments they find themselves in. The classical assimilation perspective considers mainly individual-level human capital, demographic and regional characteristics, largely ignoring the structure.

For these reasons, the classical economic assimilation model may be too tenuous for the current economic context and the demographics of new immigrants. The inverse relationship between foreign education and economic well-being, as documented in the literature, may actually be the artifact of an aggregation bias, and once the foreign-trained are partitioned by the recognition and compatibility of their skills, the direction of the relationship between place of education and earnings may reverse, or at least become

insignificant. To test the applicability of classical assimilation theory, two comparisons are made. The first comparison is the earnings of foreign-educated work visa holders and U.S.-educated workers; the second comparison involves the earnings of foreign-educated non-work visa holders and U.S.-educated workers (see Figure 1). For the classical assimilation paradigm to hold, for both comparisons, the U.S.-educated (as the more assimilated) should have higher economic outcomes than their foreign-educated counterparts. If only one comparison or neither holds, then the classical assimilation thesis is overstated for today's context (see Figure 2).

Comparisons between Work Visa and U.S. Education, Non-Work visa and U.S. Education: A Test of the Role of Visa Type

If assimilation is no longer a viable explanation for all immigrants, a possible explanation is that there is heterogeneity within the immigrant population. An emerging source of inequality within the immigrant population is between those who have skills and those without. The wage penalty attached to foreign education is generally believed to rise from its incompatibility with the U.S. economy. If, however, foreign-trained workers have been filtered and approved for work in the U.S. through the issuance of work visas, are they able to reach economic parity with their U.S.-educated counterparts?

An underlying mechanism of the issuance of work visas is that work visas are some sort of assurance for compatibility. Since foreign education is an imperfect substitute for U.S. education and employers are not always familiar with foreign-acquired credentials, employers may require some sort of indicator for education-workplace compatibility. The possession of work visas indicates to employers that these employment-based immigrants, while foreign-trained, have skill sets that are compatible with the existing economy, and accordingly, will not lose too much productivity from acclimating to host-country ways. If work visas are in fact a seal for compatibility, then foreign-educated workers who possess work visas should not suffer an earnings penalty. If the work visa hypothesis holds, then when the type of visa (i.e. work or non) is considered, there should be no difference in earnings between the foreign-educated and domestic-educated.

Foreign-trained workers who have been screened for skills should perform just as well as U.S.-educated workers. But for non-work visa holders, who have not been screened for skills, the earnings penalty should persist.

The Earnings of Science and Engineering Workers: A Test of Universalism

However, while work visas screen for skills and ensure compatibility, not all skills are equally useful and relevant to the U.S. economy. The increasing demand for foreign labor is not a sweeping phenomenon across all disciplines but is mostly unique to the S/E sector. Thus, the third question concerns a special group within the work visa population: the S/E trained. In this new technologically-dependent and driven economy where S/E skills are valued, S/E work is especially prized, leading to different economic fates across disciplines. There are reasons to believe that for S/E work visa holders, assimilation is of even less importance. If science is indeed universalistic as touted– objective, impersonal and open to talent – and S/E knowledge and skills are cross-national and cross-cultural, foreign S/E skills are then inherently transferable to the U.S. economy, and as such, do not require external validation (i.e. work visa) to prove their utility.

To test the question of whether it is work visas or S/E training that contributes to earnings parity between the foreign- and U.S.-educated, an interaction term of S/E major and place of education is included. If it is indeed S/E training that is driving the earnings penalty, and not the issuance of work visas, only S/E workers are expected to attain economic parity. The non-S/E group, even those who have been screened for skills, still may not be able to reach economic parity because some of the foreign-acquired skills are lost in the U.S. context due to the higher requirements for U.S.-specific social, cultural and linguistic knowledge in non-S/E fields.

Interaction of Micro and Macro: A Test of Segmented Economic Adaptation.

It has been proposed that in the study of immigrant adaptation, a more inclusive approach is to consider the interplay of macro-structural factors with personal characteristics (Zhou 1997). As the experiences of immigrants become more varied, and

the economy more segmented, immigrant earnings cannot be simply captured by personal (i.e. science training) or structural (i.e. work visa) characteristics alone. The interplay of the individual and the structure creates a host of divergent economic outcomes, where the effect of place of education varies not only by the discipline of academic training or by the type of visa held, but by both academic discipline and visa type. Universalism and work visa are not two mutually exclusive forces working in isolation. The benefits of a work visa together with the tenets of universalism may jointly confer cumulative economic advantages to work visa scientists. Or non-work visa, non-S/E workers may face a double penalty for two "unfavorable" statuses. To this end, a comparison of earnings differences by place of education and field of training is required between the two visa types.

To systematically find the divergent economic outcomes of each combination of the three statuses, group level means (i.e. intercepts) are compared. The examination of how the effects of science training vary by place of training between visa types is analogous to creating a three-way interaction. Foreign-educated workers may experience differential earnings outcomes depending on both their visa type and their discipline of training. Likewise, the advantages of S/E training may vary according to type of visa held upon entry to the United States and where the S/E training was acquired. Each unique combination of place of education, visa type and academic background can lead to disparate economic outcomes in this new economy.

By comparing between visa types, the assumption of homogenous effects across visa types is relaxed, allowing for the place of education and academic background effects to vary by visa type as well. For instance, work visa holders on the whole may experience economic convergence with their U.S.-educated counterparts in the U.S. labor market. But for non-S/E occupations, U.S.-specific soft skills – such as leadership skills and networking – are crucial determinants of economic mobility but are lacking in the foreign-trained population. Therefore, despite having work visas, non-science majors may still lag behind their U.S.-educated counterparts, while science majors soar. The situation may be even more unequal for non-work visa holders. While non-work visa

S/E-trained workers can rely on universalism to moderate the otherwise negative effects of foreign education, non-S/E workers may not have the necessary U.S.-specific skills to overcome the barriers of their foreign education. Non-S/E training, by and large, is less transferable than S/E work, but among the non-S/E, work visa holders – having been vetted and approved – may be better able to near parity with their U.S.-educated counterparts than their non-work visa holders.

As conceptualized by the segmented assimilation theory, an analysis of immigrant adaptation that does not include the interaction of individual and structural characteristics is too simplistic in capturing the complexities of immigrant adaptation. In the current knowledge-intensive, foreign labor-reliant economy, the majority of work visas go to S/E workers. The current state of the economy is one that is highly invested in technology, highly values S/E training and greatly rewards those with such skills. The foreign-trained S/E population is of particular interest because of the economy's high demand for S/E training and also for the transferability of S/E training as purported in the ideals of universalism. Therefore, in addition to the individual-level human capital specification, the study of immigrant earnings also calls for an interaction of the micro (i.e. place of education and S/E training) and the macro (i.e. work visa).

In the study of work visas, S/E training and the interplay of the two, it is especially apt to focus our attention on Asian Americans, as among immigrants, Asian Americans supply the lion's share of high-skill specialty labor, and more specifically, science and engineering labor. Because of the strong recruitment of Asian-trained workers for S/E work, it likely that at least for some Asian immigrants – especially those who possess S/E skills and whose skills have been vetted – their foreign education is compatible with the U.S. economy, contradicting the necessity for U.S.-acquired skills for economic success. In the past, studies have looked at the determinants of migration under visa types (e.g. Cheng and Yang 1998; Agarwal and Winkler 1984) and the earnings under different visa types (Jasso and Rosenzweig 1995), but there has yet to be a study on the interaction of visa type with individual-level characteristics. While segmented assimilation has been applied to students (Portes and Zhou 1993; Hirschman

2001), the specification for immigrant earnings still largely follows the classical human capital specification.

Data and Methods

Data

The data come from the 2003 National Survey of College Graduates. All respondents in the NSCG have at least a bachelor's degree, which narrows the scope of the study to the socioeconomic particularity of the new wave of immigrants. Since previous research has determined that place of education is the main source of earnings inequality, the analysis compares U.S.-educated Asian American workers to their foreign-educated counterparts. Further, it has been recently revealed that only foreign-born U.S.-educated men have reached economic parity with whites (Kim and Sakamoto 2010), so the U.S.-educated population is restricted to the foreign-born. With these considerations, the analytic sample consists of 4,381 foreign-born Asian American male workers between the ages of 25-64 who worked at least 35 hours per week and at least 45 weeks over the year.

Analytic Strategy

Following the basic additive human capital model, the specification is

$$y = \alpha + \beta X + \gamma Z + \varepsilon \quad (1),$$

where X contains human capital characteristics and Z, controls. More specifically, earnings is a function of such human capital characteristics as source of education (U.S. or foreign), major (S/E or non), degree of education (college or advanced), experience and its square terms, log of hours and weeks worked, and the control variable region (Northeast, Midwest, South and West). In addition to the basic human capital variables of education and experience, the specification also includes log of hours worked per week, log of weeks worked per year to account for the finding that Asian Americans overwork

to compensate for their earnings disadvantage (Min 1990), and major of highest degree to adjust for the overconcentration of Asian Americans in science and engineering fields.

To address the question of whether the effect of foreign education varies by type of visa held upon entry to the U.S., a two-part analysis is employed. In the first part, the human capital model, as specified additively above, is run for three subsamples in three separate models, which is analogous to an interaction. The first model utilizes the whole sample to compare the earnings differentials between foreign and U.S. education. The second model consists of all U.S.-educated workers and *non-work visa* holders to compare the effects of place of education between these two groups of workers. The third model includes all U.S.-educated workers and only *work visa* holders. The three stratified models allow the examination of the foreign education penalty under different visa types. If in fact the global economy has created a demand for foreign-educated immigrants who possess certain desirable skills, and the issuance of work visas serves a stamp for quality assurance, then work visa holders – despite their foreign education – should not suffer an earnings penalty. The penalty for foreign education as witnessed in previous findings may be the byproduct of aggregating along visa type, with foreign-educated workers under non-work visas driving the earnings penalty in previous studies.

The second part of the analysis adds the interaction of place of education (i.e., U.S. or foreign) and major of highest degree (i.e., S/E or non) to the human capital specification above and runs separate models for each of the subsamples mentioned above. The two variables in the interaction term are both dichotomous, with U.S. education and S/E major as 1 (0 if foreign-educated or non S/E major). The interaction of these two variables tests whether the effect of place of education varies by major under different visa types.

Results

Descriptive results (Table 1) indicate that the average log of earnings is the highest for U.S.-educated workers (~$79,000), followed by foreign-educated workers who first entered the U.S. with a work visa (~$78,000). Foreign-educated workers have

lower earnings than U.S.-educated workers, which is consistent with earlier findings of the foreign education penalty. The higher earnings of U.S.-educated workers could be attributed to their overconcentration in post-college education, with about 75% of the group holding advanced degrees. In comparison, for both the work visa and non-work visa groups, about 50% holds college degrees. Among the advanced degrees, work visa and U.S.-educated workers are more likely to have obtained master's degrees, while the non-work visa group is split fairly evenly across the three graduate degrees. U.S.-educated workers also have slightly longer work hours: on average, U.S.-educated workers work over an hour more per week than the work visa group. Non-work visa foreign-educated workers are the least represented in science and engineering majors, where job placement in similar fields generally reap high earnings. Instead, their distribution is the highest in the non-science and engineering majors, where job opportunities in corresponding fields have traditionally yielded lower earnings. For the most part, the descriptive statistics are consistent with the human capital understanding of earnings.

The OLS regression results in Table 2 in Model 1 contain the full sample. When the whole sample is taken into account, the place of education thesis holds: adjusting for human capital and geographic factors, foreign-educated workers do receive lower earnings than their U.S.-educated counterparts. To uncover the aggregation bias, the foreign-educated group is stratified into work and non-work visa holders. These two stratified groups are compared against U.S.-educated workers. Model 2 includes non-work visa holders and U.S.-educated workers. Results indicate that the foreign education disadvantage persists and appears to be even greater than the full sample for non-work visa holders. Model 3 is also a stratified model and includes work visa holders and U.S.-educated workers. When type of visa held upon entry is parsed out, the negative relationship between foreign education and earnings becomes insignificant. With the changing economy and the growing use of foreign-educated workers, especially in the professional high-tech sector, not all foreign workers are disadvantaged. These results point to the possibility of an aggregation error in previous research that predicted the relationship between place of education and earnings. Also of interest is the magnitude

of the coefficient for S/E training. Consistent with the demand for S/E labor and the premium placed on S/E training, S/E workers earn more than their non S/E counterparts. The magnitude of the coefficient in Model 2 is greater than that in Model 3, indicating the greater disparity in earnings between S/E and non-S/E workers among non-work visa holders. The larger earnings gap between the two groups seems to suggest that non-work visa non-S/E immigrants experience greater disadvantages in the U.S. labor market. Or, it could suggest that, be it through causation or selection, work visas grant otherwise low-earning non-S/E higher wages.

In this new knowledge economy that is technology-driven and heavily dependent on foreign-trained workers, the effects of place of education effects could differ by field of training. Workers whose productive capacities are considered useful to the U.S. labor market could experience favorable economic outcomes despite their foreign education. If their skills are valued, their foreign education may be inconsequential. The transferability story is a supply-side story as well. For S/E majors, their training is assumed to be consistent across national contexts, but non-S/E training imparts location-specific expertise. When foreign-acquired S/E training is used in the U.S. context, very little knowledge is displaced through the transferring process. But since non-S/E training is country-specific, when it is applied to a cultural context that is different from where it was acquired, much information is lost. Therefore, an interaction term of place of education and major is included to reflect the differences in portability of S/E and non-S/E training.

Model 1 of Table 3 contains the full sample and indicates that U.S.-educated and S/E-trained workers continue to reap higher economic gains. The main variable of interest is the interaction term. The significant negative coefficient for the interaction term suggests that foreign-educated S/E workers are able to make greater gains for their S/E training than U.S.-educated S/E workers, but even with the greater gains, foreign-educated S/E workers are unable to reach parity with their U.S.-educated counterparts. The foreign-educated S/E population's ability to inch closer to their U.S.-educated counterparts implies that S/E is more transferable cross-culturally than non-S/E training.

However, foreign-trained S/E workers are still unable to reach convergence, suggesting that though universalistic, foreign S/E training is still not a perfect substitute for U.S.-based training.

The restricted subsample of non-work visa holders and U.S.-educated workers in Model 2 paints a similar. The negative coefficient (-.358) signifies that non-work visa S/E workers are closer to convergence with their U.S.-educated counterparts than non-S/E workers. It appears that S/E workers have an advantage that moderates their otherwise negative foreign education effect, but not enough to fully narrow the gap between the two sources of education. This advantage held by S/E workers lends support to the thesis of universalism, but universalism is not strong enough to nullify the place of education thesis. However, even though the non-work visa S/E group can inch closer economically, it is not able to make the same gains as the general foreign-educated S/E population. The coefficient of the interaction term for the whole sample is -.407, compared to -.358. for the restricted non-work visa sample. The bigger negative coefficient indicates that the foreign-educated S/E group on the whole is better able to resemble their U.S.-educated counterparts economically than the non-work visa group.

Model 3, which includes work visa holders and U.S.-educated workers, diverges from the pattern. In fact, compared to Model 3 of Table 2, with the inclusion of the interaction term, foreign education is actually penalized, contradicting the finding in Table 2 that work visa holders can reach economic parity with U.S.-educated workers. However, this penalty is only specific to non-S/E workers (see Figure 3). Even among work visa holders who were "pulled" to work in the U.S., non-S/E workers continue to earn significantly less than their U.S.-educated counterparts. A different story emerges for S/E workers. Not only do S/E workers not suffer an earnings penalty for their foreign education, but they actually surpass their U.S.-educated counterparts in earnings (Table 4).

The greatest earnings disparity occurs within the non-S/E-trained between the U.S.-educated and non work visa holders (.635). This disparity is especially marked when

contrasted with the disparity between work visa and U.S.-educated workers (.347) (Table 3). This stark contrast sheds light on the compounding disadvantages of the two negative statuses of non-work visa and non-S/E training. A possible explanation lies in the place-specific, non-transferable soft skills that come with a non-S/E education. As argued above, work visas act as some sort of filter for job-skill compatibility, therefore, even though foreign-educated non-S/E-trained workers are assumed to lack the necessary U.S.-specific cultural knowledge that non-S/E work entails, the possession of a work visa authenticates that these workers have at least some skills that are useful in the U.S. economy. But when foreign-trained workers lack both location-invariant technical skills *and* some kind of validation of their foreign skills, the ensuing economic disadvantage is multiplied.

Conversely, the disparities between the two places of education are noticeably smaller within the S/E-trained. In fact, even in the absence of work visas, S/E-trained workers experience a smaller earnings disparity (.277) with U.S.-trained workers than work visa non-S/E workers are with the U.S.-trained (.347), showing that there is some universalism at work. The greater disparity between work visa non-S/E and U.S.-educated workers (.347) suggests that while the issuance of work visas acts as a stamp for compatibility, it is not enough for equal earnings. The pathways to economic convergence are varied and not dictated by one dominant strategy (i.e. assimilation, work visas or universalism), but rather the various strategies jointly determine economic outcomes.

For the most part, work visa holders are able to enjoy economic convergence with their U.S.-educated counterparts, but this is primarily because of the high concentration of work visa holders in S/E fields, where work visa holders actually receive an earnings premium for their S/E training. However, while S/E training provides economic advantage, it does not guarantee parity for all workers, as evident in the persistent earnings disparity of non-work visa holders, even among the S/E-trained. The disparate effects of work visas on S/E and non-S/E workers reveal that work visas are not a foolproof mechanism to ascertain the compatibility of foreign-acquired capital and thus,

do not uniformly translate into equitable earnings. The privilege that is unique to S/E-trained, employment-based immigrants suggests that both micro- and structural-characteristics work together to effect immigrant earnings.

Discussion and Conclusion

As with other post-industrial advanced societies, the demand for foreign-trained labor has increased considerably in the American economy, thus challenging the basic assumptions of classical assimilation and the seminal finding of discounted immigrant earnings. In the new economy, the necessity of "assimilation" appears to have lessened, as evidenced by the economic parity that can be achieved even in the absence of U.S.-acquired human capital. The results show that when the data are aggregated over the dimension of place of education, the earnings disadvantage experienced by foreign-trained workers persists. But when the sample is stratified by visa type, immigrants who possessed work visas upon first entry to the United States do not suffer from an earnings penalty for their foreign human capital, suggesting that the foreign education penalty thesis is overstated. As long as foreign-trained workers have comparable skills, as confirmed by the issuance of work visas, economic convergence is easily within reach. That is not to say that place of education has ceased to matter. U.S. education continues to impart U.S.-specific human and cultural capital that is required in the U.S. labor market. But for foreign-trained workers who have U.S.-compatible knowledge and skills, albeit foreign-acquired, place of education is no longer consequential. The ability of foreign-trained workers to reach economic parity hints that the earnings disparity for Asian Americans does not occur solely at the juncture of foreign or domestic education. Rather, an economy that relies on high-skill, foreign-trained workers also requires the consideration of visa type.

In the current knowledge economy where S/E training is especially valued, and the bulk of high-skill work visas today go to S/E-trained workers, S/E-trained workers immigrants have an advantage in the labor market over their non-S/E counterparts. For non-work visa holders, S/E-trained foreign-educated workers are able to make bigger

economic strides and inch closer to their U.S.-educated S/E counterparts than non-S/E-trained workers. Though lacking in accreditation of the compatibility of their skills, foreign-trained S/E workers are better able to transfer their skills to the U.S. economy than non-S/E workers. The S/E advantage is especially evident among work visa holders, where a premium is actually placed on foreign S/E training.

Speculation about the link between place of education and earnings has generally been broken down into two mechanisms. The first is that foreign-educated workers are *actually* inadequate workers, and the second is that the employer *perceives* foreign-educated workers to be so. If foreign-educated workers have transferable human capital and their utility is validated by the U.S. labor market, then foreign education does not automatically lead to lower earnings. For S/E-trained workers, whose skill sets are objective and standardized, their skills are more easily transferable than non-S/E training, which is generally believed to teach "soft skills." In science and engineering work, social, cultural and linguistic skills that come with assimilation may be of less importance.

That work visa holders on the whole are able to reach parity with their U.S.-educated counterparts and outperform U.S.-educated science and engineering-trained workers suggest that the issuance of work visas can have a direct bearing (i.e. "causation") on labor market outcomes or could be a proxy for unmeasured characteristics (i.e. "selection"). From the "causal" perspective, a work visa allows workers to work, legitimizing their employment, and in turn, demands equitable earnings. A work visa also provides some sort of validation or recognition of the worker's abilities and potential as a worker, resulting in fair wages. Or indirectly, possessing a work visa and securing adequate employment upon first entry provides U.S.-specific training and information channels that open up opportunities for upward or lateral job movement. From a selection perspective, the assumption is that these workers have demonstrated expertise in their fields in their home country, and as a result of their performance, have been assessed to be usable in the U.S. labor market. More specifically, in this technologically-advanced economy, science and engineering workers are especially rewarded. Because of their potential for productivity, these workers were "selected" to

work in the U.S. labor market and are a different stock of immigrants. Unlike the prototypical immigrant who lacks both human and cultural capital necessary for economic success in the U.S. labor market, high-skill immigrants have the requisite human capital skills, and while perhaps lacking in cultural capital, are channeled into work that does not require strong U.S.-specific cultural competence.

The advantaged economic position of work visa holders can be understood in the context of "brain drain." In a labor market that is increasingly reliant on foreign labor, workers are recruited to fill labor shortages, especially in such areas as science and engineering which require high levels of expertise. The lack of disadvantage may be due to the innate ability of the worker, and the suitability of their foreign-acquired human capital for the U.S. labor market. Their talent and the need for their talent allow them to traverse the U.S. labor market unfettered.

These results refute the economists' claim that the "supply" of the post-1965 immigrants is of a lower stock than the previous wave of immigrants, rendering the American Dream of upward mobility more difficult, if not impossible. In the foreign labor-dependent economy, many immigrants come to the U.S. as human capital immigrants with high levels of education, and specialized skill sets and expertise. The growing presence of human capital immigrants and their economic success in the U.S. suggest neither a decline in immigrant quality nor a shift in policy that disregards individual qualifications.

The advantageous economic position of work visa holders also challenges the applicability of the economic assimilation model and highlights the salience of human capital in immigrant earnings in today's economy. The classical assimilation model predicts that immigrants will only become more like natives through "assimilation." While the old paradigm portrays immigrants as a homogeneous group entering the United States occupying the bottom of the socioeconomic totem pole, the new reality is that immigrants come equipped with vastly different levels of skills and occupying different socioeconomic rungs, with some already at the very top. The finding that work visa

holders are able to attain economic parity, or in some cases even surpass the U.S.-educated in earnings, seem to point to the declining necessity of assimilation for economic convergence.

However, economic parity in the absence of "assimilation" is only unique to S/E-engineering work visa holders. While it is true that for these workers, "assimilation" is not necessary to have high economic standing, part of the story is that S/E work does not require the sociolinguistic skills that come with assimilation. For those trained in non-S/E fields, where skill sets are country-specific, assimilation is still a crucial determinant for economic parity.

Economic success without assimilation is not yet a feasible goal for all immigrants. In fact, only science and engineering workers with work visas are immune to the penalties of foreign education, signifying that assimilation is less important *only* for S/E workers. Because of the nature of S/E work, which is highly technical and generally does not involve extensive linguistic or socio-cultural skills, workers may not need to adapt to their host country to excel in their respective occupations and attain equitable earnings. Economic success in the United States depends not only on personal characteristics, or else earnings would be consistent within place of education and science and engineering training. Likewise, parity cannot be reached by structural characteristics alone, or else all work visa holders would experience earnings convergence irrespective of training. That each combination of macro and micro has distinct outcomes lends support to the argument that American society is becoming increasingly segmented. These segmented findings from the interplay of work visa and human capital call attention to the urgency of studying the individual, the structural and the interaction of the two in determining the earnings of today's immigrants.

Populations

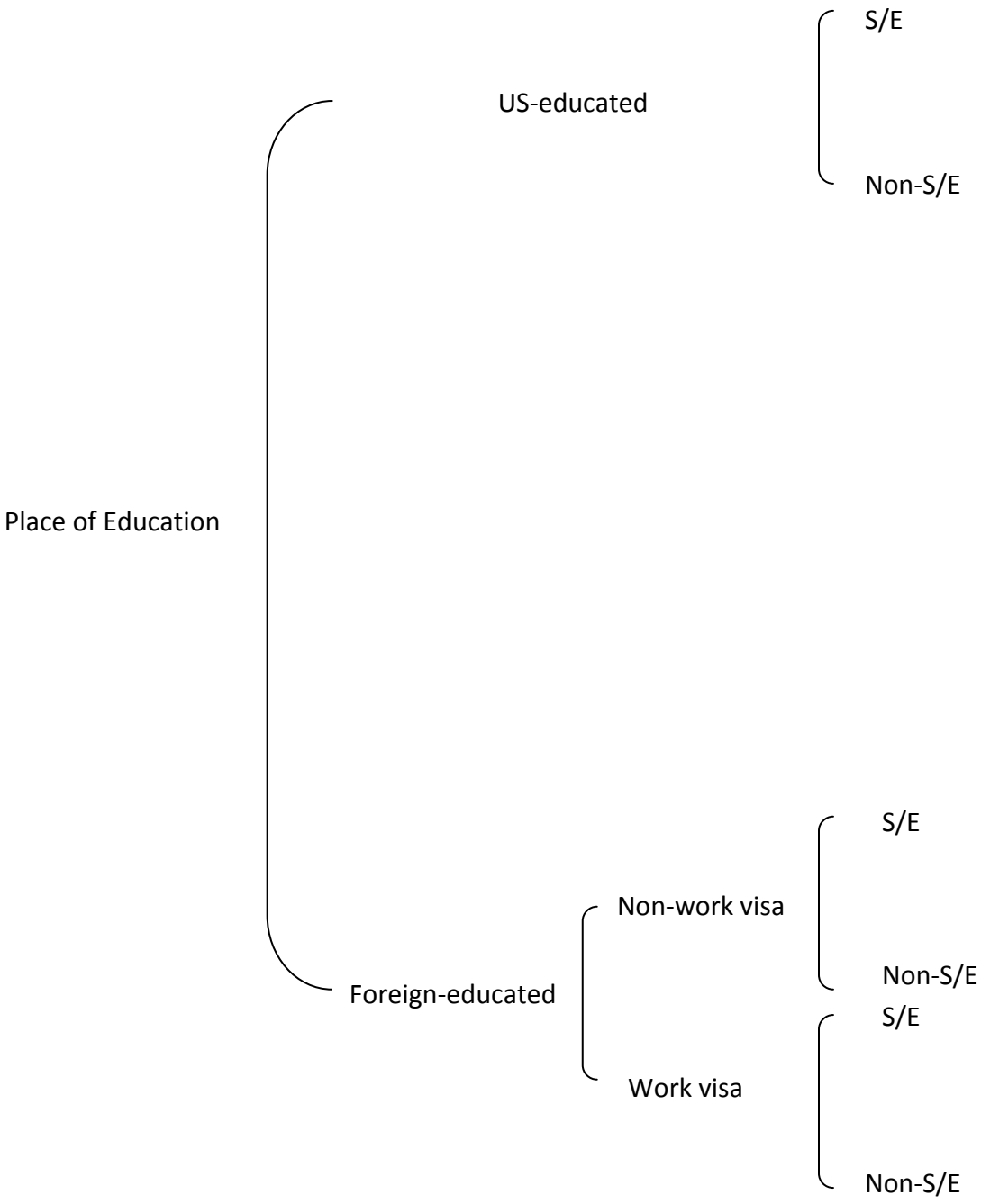

Figure 3.1. Definition of Populations.

Non work visa			Work visa		
	Visa type			*Visa type*	
Place of Education	Non-S/E	S/E	*Place of Education*	Non-S/E	S/E
Foreign Education	A	B	Foreign Education	E	F
US Education	C	D	US Education	G	H

Hypothesis		**Coefficient of interest and sign of coefficient**
Work Visa Advantage		*Place of Education*
Non-work visa & US edu	A<C, B<D	Positive
Work visa & US edu	F=H , E=G	Not significant
Universalism		*Place of Education x S/E Major*
Non-work visa & US edu	A<C, B=D	Negative
Work visa & US edu	E<G, F=H	Negative
Segmented Earnings		*Place of Education x S/E Major*
Non-work visa & US edu	(D-B)≠ (A-C)	Varied
Work visa & US edu	(H-F) ≠ (G-E)	Varied
Segmented Earnings		*Place of Education x S/E Major*
Non-work visa & US edu	(D-B)≠ (A-C)	Varied
Work visa & US edu	(H-F) ≠ (G-E)	Varied

Figure 3.2. Hypotheses.

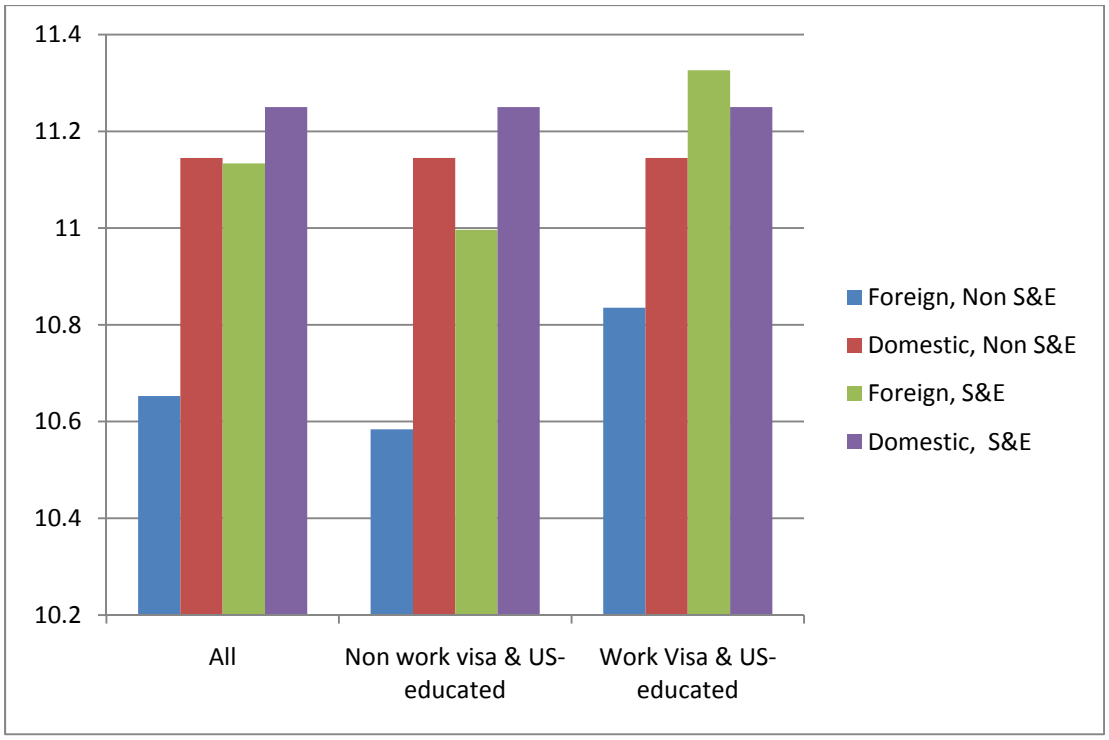

Figure 3.3. Group-level Mean Log of Salaries.

Table 3.1. Descriptive Statistics (N=4,068)

	Foreign		US
	Work Visa	Non Work Visa	
% in Sample	13.62	22.76	63.62
Log of Salary	11.259	11.068	11.279
Education			
% Bachelors	52.71	50.86	24.19
% Masters	35.20	15.55	46.29
% Doctorate	9.03	17.06	25.7
% Professional	3.07	16.52	3.83
Experience	13.693	22.461	11.975
Log of Hours Worked	3.792	3.816	3.823
Log of Weeks Worked	3.945	3.945	3.946
Majors			
% Science & Engineering	84.84	77.86	80.91
Region			
% Northeast	24.73	29.59	21.60
% Midwest	18.41	15.87	17.77
% South	23.29	22.89	23.80
% West	33.57	31.64	36.82

Notes: Figures are unweighted statistics.

Table 3.2. Estimated Regression Coefficients for OLS Models Predicting Log of Salary by Visa Type

	All (Model 1)		Non-Work (Model 2)		Work (Model 3)	
	Coef	SE	Coef	SE	Coef	SE
Place of Education						
US Educated	0.243 ***	0.036	0.403 ***	0.046	0.046	0.043
Major						
S&E	0.236 ***	0.036	0.172 ***	0.035	0.136 **	0.040
Degrees						
Masters	0.212 ***	0.035	0.227 ***	0.038	0.189 ***	0.035
Doctorate	0.194 ***	0.035	0.251 ***	0.037	0.197 ***	0.040
Professional	0.538 ***	0.054	0.616 ***	0.058	0.433 ***	0.073
Experience						
Experience	0.032 ***	0.005	0.036 ***	0.005	0.036 ***	0.006
Experience ^{2}	-0.001 ***	0.000	-0.001	0.000	-0.001 ***	0.000
Work Characteristics						
Log of hours worked	0.594 ***	0.083	0.645 ***	0.086	0.522 ***	0.099
Log of weeks worked	0.340	0.727	1.161	0.706	-0.512	0.726
Region						
Midwest	-0.032	0.040	-0.039	0.044	-0.088 *	0.043
South	-0.139 **	0.044	-0.172 ***	0.046	-0.130 **	0.048
West	-0.028	0.036	-0.066	0.037	-0.010	0.037
Constant	6.863 *	2.848	3.271 +	2.762	10.760 ***	2.836
R2	20.70		26.37		13.77	
Obs						

Notes: Data are weighted. Reference categories are foreign education, non S&E major, bachelor's degree, and east.

*+p<10, *p<.05, **p<.01, ***p<.001*

Table 3.3. Estimated Regression Coefficients for OLS Models Predicting Log of Salary by Visa Type with Interaction

	All (Model 1)		Non-Work (Model 2)		Work (Model 3)	
	Coef	SE	Coef	SE	Coef	SE
Place of Education						
US Educated	0.522 ***	0.072	0.635 ***	0.080	0.347 **	0.117
Major						
S&E	0.465 ***	0.063	0.404 ***	0.071	0.480 ***	0.117
US Education x S&E	-0.407 ***	0.073	-0.358 ***	0.080	-0.424 **	0.122
Degrees						
Masters	0.213 ***	0.034	0.227 ***	0.038	0.189 ***	0.034
Doctorate	0.212 ***	0.034	0.260 ***	0.036	0.210 ***	0.040
Professional	0.510 ***	0.053	0.585 ***	0.057	0.435 ***	0.072
Experience						
Experience	0.034 ***	0.005	0.037 ***	0.005	0.036 ***	0.006
Experience ^{2}	-0.001 ***	0.000	-0.001 ***	0.000	-0.001 ***	0.000
Work Characteristics						
Log of hours worked	0.598 ***	0.081	0.628 ***	0.086	0.560 ***	0.095
Log of weeks worked	0.288	0.745	1.121	0.714	-0.550	0.766
Region						
Midwest	-0.046	0.040	-0.052	0.045	-0.094 *	0.041
South	-0.159 ***	0.042	-0.191	0.044	-0.140 **	0.045
West	-0.035	0.034	-0.070 ***	0.035	-0.019	0.035
Constant	6.885 *	2.927	3.342 *	2.802	10.515 ***	3.001
R2	23.06		28.03		15.74	
Obs	4068		3514		3142	

Notes: Data are weighted. Reference categories are foreign education, non S&E major, bachelor's degree, and east.

*+p<10, *p<.05, **p<.01, ***p<.001*

Table 3.4. Relative Salaries by Visa Type, Place of Education and Major

	All	Non-work visa	Work visa
Non-S/E	0.611 **	0.571 ***	0.734 ***
S/E	0.890 **	0.776 ***	1.079 **

Notes: Ratios computed using adjusted means of foreign-educated and US-educated

*+p<10, *p<.05, **p<.01, ***p<.001*

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CHAPTER 4

AN EXAMINATION OF THE EFFECTS OF MISMATCH ON EARNINGS

In both academic literature and popular opinion, Asian Americans are believed to have fulfilled the American Dream by reaching economic convergence with whites. This optimistic portrayal of immigrant adaptation, however, is largely due to the higher levels of academic attainment among Asian Americans (Hirschman and Wong 1984). To explain this "overeducation" paradox, scholars, by convention, generally invoke the immigrant human capital framework, and whatever cannot be explained away by variations in human capital and assimilation is then either attributed to overt discrimination or unobserved characteristics tied to assimilation and ethnicity, leaving this puzzle essentially unresolved. It was not until a series of recent studies that had the insight to partition place of education into foreign and domestic sources that put this longstanding debate to rest. Once the location (i.e. U.S. or abroad) of the highest degree is taken into account, U.S.-educated Asians are able to fare just as well as whites (Zeng and Xie 2004).

Though the disaggregation of place of education has provided closure to this "overeducation" puzzle by explaining the between-race earnings gap, it has uncovered the heterogeneity within the Asian American population. Place of education has emerged as a stratifying dimension in the earnings inequality *within* the immigrant pool. If the Asian-white earnings gap can be explained by place of education, what then accounts for within-race inequality, namely along place of education? It has been suggested that foreign education is devalued in the U.S. labor market, which may block opportunities for adequate employment. If so, a plausible mechanism linking foreign education and discounted earnings is the lack of education-occupation fit among the foreign-educated.

This paper seeks to examine the validity of mismatch in the earnings disparity between foreign- and domestic-educated Asian immigrants. Data from the National Survey of College Graduates 2003 are used to determine whether foreign-educated Asian Americans are more likely to experience education-occupation mismatch and whether mismatch can explain the significance of place of education in earnings. This paper consists of two parts. The first uses conditional logit models to test the hypothesis of greater mismatch among the foreign-educated by exploring the differential odds of U.S.- and foreign-educated workers suffering from mismatch. Once it is determined that foreign-educated workers experience a higher rate of mismatch, human capital models are estimated, first additively then multiplicatively with an interaction term of place of education and mismatch. General findings indicate that foreign-educated individuals are more likely to be mismatched. OLS results indicate that U.S. education does lead to higher returns and mismatch to lower earnings. But once the interaction of source of education and mismatch is considered, place of education is no longer significant: foreign-educated workers who are able to "match" are able to reach economic convergence with their U.S.-educated matched counterparts. However, the earnings parity that is reached through "matching" is largely achieved through the "overemployment" of Asian American workers.

Asian Americans and the Heterogeneity Within

Recent studies have revealed the importance of place of education, shedding light on the inequality within race. Though scholars have long cautioned against lumping the Asian American population into a monolithic group, past studies have largely focused on Asian American economic adaptation vis-à-vis their white counterparts (i.e. race effect). The diversity in immigration histories, human capital and resources among the immigrants leads to divergent economic paths in American society. Despite an awareness of such differences within race, systematic studies of the variation within the Asian American population have been scant.

At first blush, in both academic literature and popular culture, the Asian American population on the whole lends much support to the model minority thesis. By many

socioeconomic measures, Asian Americans appear to have succeeded economically in American society. Compared to the general population, Asian Americans are more likely to receive a college education, participate in the labor force, occupy managerial and professional posts, and have high median earnings (Reeves and Bennett 2004). Empirical studies have corroborated such statistics. Asian Americans can reach economic parity with their white counterparts when variations in human capital and assimilation characteristics (Chiswick 1983; Tang 1996; Iceland 1999; Sakamoto and Furuichi 2002) are held constant, discounting the effect of race in the labor market (Sakamoto et al. 2000).

However, such a portrayal of the Asian American population has been considered too general and erroneous. Census statistics indicate that though Asian Americans are more likely than the general population to have high levels of educational attainment, half or more of the Hmong (59.6%), Cambodian (53.3%) and Laotian (49.6%) immigrants do not have a high school education compared to only 19.6% of the general population. Likewise, their representation in higher education is significantly lower than that of the general population: only 7.5% of the Hmong population has at least a bachelor's degree compared to the general population (24.4%) and the highest achieving Indian group (63.9%). In terms of labor market outcomes, while Asian Americans are the most represented in managerial and professional positions, there is considerable variation within race, with only about 13% of the Laotian population occupying such occupations, in contrast to 60% of the Indian population. The polarity in occupations is reflected in the economic disparity between Indians who have the highest income ($70,708) and Hmongs ($32,384) the lowest. The economic success of certain immigrant groups stands in direct contrast to the economic distress of Southeast Asians, which is especially evident in the high poverty rate among Hmongs (37.8%).

Not only does the Asian American success story mask economic inequality among the Asian origin groups, but it also obscures the strategies Asian Americans employ to reach economic parity with whites. While Asian Americans have higher than average earnings and education, their higher earnings come at the cost of "overeducation"

(Hirschman and Wong 1984). To be on par economically with their white counterparts, Asian Americans have to obtain even higher levels of education, contradicting the canonical human capital model. This overeducation paradox has motivated two decades of scholarship, but until recently, there was little definitive resolution. Recent studies have found that the missing piece to this age-old puzzle actually lies in the different locations where whites and Asians obtained their highest level of education. Once the source of the education is partitioned into foreign- or domestic-acquired, the earnings gap between whites and Asians disappears. But this same finding has also revealed the earnings disparities by place of education *within* the Asian American population. The most often suggested – and plausible – explanation is that foreign education is not portable to the American economy, contributing to the depressed earnings of foreign-educated workers.

From the demand side, given the heavy emphasis on credentialism as a signal of productivity in U.S. society, foreign-educated workers may not be recognized for their training received abroad. From the supply side, immigrants may not have the necessary language abilities to find jobs commensurate with their training, and subsequently, are channeled into low-paying occupations that do not require English proficiency. A U.S.-based education also provides information channels and social networks that open up job opportunities. Lastly, at the macro-structural level, federal policies grant immigrant students short-term work visas upon graduation, which facilitate placement into occupations that are closely related to their respective fields of training. Because of inequalities in hiring practices and access to employment, foreign-educated immigrants may have difficulty finding adequate work and are thus sorted into occupations with lower human capital thresholds, resulting in lower pay.

Theoretical Issues

Racial Discrimination

Explanations for the earnings gap between Asians and whites generally fall under two camps: racial discrimination and immigration. The *racial discrimination* view

largely draws on the majority-minority paradigm that has influenced much of the sociological understanding of racial inequality (Sakamoto et al. 2009). It is argued that racial minorities in the U.S. suffer from depressed earnings as a result of subjugation from the dominant group. From restrictive immigration policies banning Asian entry to labor market practices shuffling Asian immigrants into the secondary labor market (Bonacich 1972), it is argued that native whites exploit immigrants in order to maintain their own dominance and to subordinate minorities. Scholars espousing the racial discrimination perspective believe that the "model minority" thesis was a myth contrived by the majority to suppress non-Asian minority groups, to preserve the impression of American meritocracy and to conceal the dire socioeconomic conditions of many Asian ethnic groups.

The racial hierarchy view, however, has been called into question in this post-Civil Rights era. Research has found empirical support for Wilson's seminal thesis of the declining significance of race (Sakamoto et al. 2000). With the exception of Hispanics, there has been a significant decline in the wage penalty attached to race since the Civil Rights Movement, especially among Asian Americans who are found to have reached economic parity with whites. Indeed, when individual-level human capital and assimilation characteristics, such as place of education (Zeng and Xie 2004) and English language ability (Stolzenberg and Tienda 1997), are included in the earnings function, the wage gap between whites and Asians disappears. The erasure of a racial earnings disparity suggests that inequality stems from non-racial roots, especially as the *within* race inequality becomes increasingly visible.

Classical Economic Assimilation Perspective

If not race, then scholars generally attribute the earnings gap to *immigration*, namely differences in both *human capital* and degree of *assimilation*. The classical assimilation perspective argues that assimilation is the key to upward mobility, and unassimilated immigrants will invariably suffer in the labor market. For whatever reason – be it assimilation, culture, or human capital – foreign education is devalued, resulting in the lower earnings of foreign-educated workers. The human capital approach argues that

all sources of income inequality stem from variations in human capital and not from ascribed characteristics, such as race. All things equal, workers with higher levels of human capital (e.g. education and work experience) are assumed to have higher productivity and efficiency, and as a result, higher earnings. However, when it comes to immigrant earnings, quantitative differences in human capital measures such as education received, years of work experience, and hours worked cannot fully account for the earnings gap between immigrants and natives. Upon first arrival, immigrants who are comparable on human capital characteristics with natives still suffer an initial economic setback (Chiswick 1978), suggesting that assimilation-related characteristics are also at work in the determination of immigrant earnings. The foreign contexts in which immigrants were acculturated often produce capital that is the same in degree but not in kind. In terms of hard skills, immigrants may lack the necessary English language ability to thrive in the American workplace. As for soft skills, the workplace may undervalue the cultural traits associated with Asian ethnicity, and immigrants may not have the extensive web of networks that are crucial for career mobility.

It is assumed that immigrants initially lack the necessary U.S.-specific skills that are linked to upward mobility. However, U.S.-specific capital can be learned and acquired through an Americanization process that incorporates the immigrant population into American mainstream society. Through acculturation, immigrants come to adopt the norms and practices of the native population (Gordon 1964), and as they begin to resemble the average native in cultural ways, they are expected to achieve income parity with natives. Much empirical research has substantiated this stylized portrait of immigrant economic achievement through assimilation. It is expected that within 15 years' time, foreign-born workers who initially lagged behind economically can catch up to, if not surpass, their native-born counterparts in earnings (Chiswick 1978). When immigrants come to resemble native whites in nativity (Iceland 1999; Sakamoto and Furuichi 2002), English ability (Stolzenberg and Tienda 1997), and the acquisition of U.S. education (Zeng and Xie 2004), the earnings disparity between Asians and whites disappears.

The Transferability of Foreign Education

Classical assimilation theory appears to be a robust explanation in the earnings inequality *between* races. For *within* race inequality, especially concerning the economic disadvantage of foreign-educated workers vis-à-vis their U.S.-educated counterparts, the classical assimilation theory also provides a convincing argument. The fundamental premise of assimilation theory is that the more-assimilated fare better economically than the less-assimilated because of the former's greater degree of acculturation – the adoption of white normative ways. For the same level of human capital, U.S.-educated workers – being the more-assimilated – are expected to have better labor market outcomes than their less assimilated foreign-educated counterparts. A U.S.-based education confers many advantages. Directly, U.S. education offers English language training that equips workers with the necessary skills for employment in an English-speaking workplace. Indirectly, U.S. education also imparts cultural knowledge and builds social networks that help immigrants navigate the American workplace. In contrast, the language which foreign education is conducted, and the context in which it takes place are origin-specific, infusing students with norms and values that are specific to the origin, but not necessarily compatible with the host country. Thus, foreign education is not a perfect substitute for U.S. education in the U.S. economy. These incompatibilities between the two sources of education result in the devaluation of foreign education and, in turn, the lower earnings of foreign-educated workers (Friedberg 2000, Zeng and Xie 2004, Arkesh 2006).

In addition to assimilation-related reasons, foreign education is generally devalued because of its perceived quality. The Immigration Act of 1965 abolished national quotas that were in place to check low-skill immigration and instead made family reunification a basis for entry. Such changes in immigration policy ushered in a wave of immigrants that are generally considered to be of a lower stock (Borjas 1994). Immigrants today are largely from countries that are poorer and less developed than the U.S. – with the majority of immigrants from Latin America and Asia – lending to the belief that foreign-acquired education is inferior in quality. Even for the well-trained and well-equipped foreign-educated workers, they continue face occupational barriers in the

form of licensures and credentials. Employers routinely use credentials to as a signal for worker productivity (Spence 1973). In the absence of full information about job applicants, especially when the foreign-acquired credentials are unfamiliar, employers may associate the foreign-acquired education with decreased worker productivity and come to devalue foreign education. In many cases, the lack of U.S.-recognized, U.S.-acquired credentials bars workers from working in their professional specialties, constraining such workers to readily accessible but low-paying jobs.

While the evidence against the transferability of foreign education is strong, there are anomalies. In a study of the portability of foreign education to Israel, Friedberg (2000) finds that while foreign education is discounted overall, foreign-educated immigrants from the West do not suffer an earnings penalty, suggesting that foreign-acquired education is transferable when the foreign source is highly valued in the host country. Similar findings hold in the U.S. context: immigrants from countries that are more "developed" in terms of literacy rate and GNP and are closer in geographic proximity to the U.S. have higher earnings (Jasso and Rosenzweig 1990). The high earnings of these immigrants suggest that economic and cultural closeness to the host country facilitates the transferability of foreign-acquired skills.

Further, immigration is a highly-selective and costly decision that requires both financial and social resources (Waters and Eschbach 1995; Portes and Rumbaut 2006). Previous evaluations of the low stock of today's immigrants failed to consider the whole spectrum of contemporary immigrants. A marked departure from the immigrants of old[5] is the diversity in socioeconomic status among today's immigrants. Human capital immigrants are equipped with high levels of education prior to immigration, and upon arrival, immediately occupy high rungs of the occupational ladder, bypassing all the intermediary steps implied in the classical assimilation framework (Zhou 1997). As a

[5] Drawing broad brush strokes, the consensus among scholars is that the immigration history in the US is characterized by two distinct waves: pre- and post- Immigration Act of 1965. The pre-1965 immigrants were largely of European and poor social origins. The "new" immigrants are mainly from Asia and Latin America, and their economic resources run the gamut, with some entering as highly-skilled professional immigrants, and some as refugees seeking asylum.

matter of fact, a recent phenomenon in advanced industrial societies is the growing demand for well-educated foreign-trained labor. Whereas the Immigration Act of 1965 ushered in a wave of low-skilled immigrants, immigration policies in the 1990s made skill-based immigration a priority (Cornelius and Espenshade 2001) and increased the number of specialty work visas issued to foreign-trained workers (INS 2004). This new demand for highly-skilled immigrants suggests that at least for human and intellectual capital immigrants who have skills that are useful to the U.S. economy, their foreign education is of value to the U.S. economy and as a result, do not suffer from the same depressed economic conditions endemic among the foreign-educated.

Labor Underutilization and Mismatch Framework

An emerging theme in the study of Asian immigration is the heterogeneity within the population (Kim and Sakamoto 2010) and the failures of the classical assimilation paradigm to capture the adaptation of contemporary immigrants. The recent demand for foreign-trained workers, especially in high-skilled occupations, tells a different story of the potentially high utility of foreign labor, suggesting that at least *some* foreign education is transferable. For the foreign-trained who have compatible human capital and are able to find adequate employment, economic parity may not be out of reach. Rather than understanding the determinants of economic outcomes from a sweeping classical assimilation perspective, which uniformly predicts economic success for the assimilated, a *heterogeneity approach* allows for variations within the population. The heterogeneity approach examines subgroup variability and argues that the Asian American penalty in the labor market is not widespread across the population. Once differences in human capital, demographics and other measurable factors are specified, the penalty associated with Asian race largely disappears (Iceland 1999, Zeng and Xie 2004, Kim and Sakamoto 2010.) At the root of the heterogeneity approach is the concept of aggregation bias, where the negative relationship between foreign education and earnings is reversed when foreign education is further broken down into more specific groups.

Drawing from the heterogeneity approach, a possible explanation for the lower returns to foreign education could be the inability of *some* immigrants to transfer their

foreign skills and find adequate employment in the host country. Common in popular culture is the story of the highly-educated foreign-trained doctor who gives up a lucrative career in the home country to pursue the American Dream. Upon entry to the U.S., the doctor is unable to find adequate work, so he resorts to a menial low-paying job to make ends meet. Shortages in U.S.-specific capital among the foreign-educated relegate them to occupations that have low bars for entry, and incidentally, are also low-paying. For some immigrants, however, such as the recent influx of foreign-trained specialty workers, their foreign education appears to be transferable to the U.S. context, and if so, may be spared of the labor market penalty associated with foreign education. To understand the disparate economic outcomes of foreign-educated workers, a *mismatch* framework is utilized. While the human capital and assimilation perspectives consider individual-level characteristics as determinants of economic attainment, a mismatch approach takes into account the education-occupation fit. In the human capital and assimilation frameworks, parity in education and acculturation leads to parity in economic outcomes. But in the mismatch framework, when human capital and level of assimilation are equal, the matched are still expected to have higher economic attainment than the mismatched.

Despite the "model minority" stereotype, net of human capital and assimilation, occupational mismatch is the most prevalent among Asian Americans, especially among the highly-skilled (Madamba and DeJong 1997; DeJong and Madamba 2002). Contrary to conventional human capital wisdom, the "overeducation" of Asian Americans does not translate into higher occupational opportunities. Rather, Asian Americans are more likely to work in occupations that have lower educational requirements than their actual qualifications[6]. Further, within the Asian American population, the foreign-born population suffers from a greater level of mismatch than the native-born population, suggesting that mismatch in part stems from immigrants' limited U.S.-specific capital and the lack of transferability of foreign skills. An explanation for the higher rate of mismatch among Asian Americans is that mismatch is a form compensation for

[6] In the Labor Utilization Framework, job mismatch – the form of underemployment most common among Asian Americans – is defined as attaining an educational level that is one standard deviation above the educational requirement of the occupation (Clogg and Shockey 1984).

deficiencies in human capital (Sicherman 1991). In the case of Asian Americans, specifically among the foreign-educated, they are lacking in U.S.-specific skills, thus, must overeducate as compensation, resulting in their greater incidence of mismatch.

Mismatch is an important social issue because it has serious economic consequences. Mismatched workers receive earnings that are lower than what they would have received had they found adequate employment (Hartog 2000; Bauer 2002). Returns to actual qualifications are also less than the returns to the required qualifications of the occupation. In other words, highly-educated Asian Americans who are underemployed are not compensated commensurate with their actual human capital but with the requirements of the job, resulting in lower earnings than otherwise expected of their education. The high incidence of mismatch among Asians and the lower economic returns to mismatch net of educational qualifications present mismatch as a likely explanation for the lower earnings of foreign-educated workers.

Research Questions and Hypotheses

The standard *classical assimilation* explanation posits that the foreign-educated population is disadvantaged in the labor market because of their shortages in U.S.-specific skills and knowledge. An assumption of this paradigm is that the better-assimilated will unequivocally have more favorable labor market outcomes than the less-assimilated. An alternative explanation – education-occupation *mismatch* in the labor utilization framework – is offered. The main assumption of the mismatch framework is that inadequate employment in the form of poor fit between academic training and occupational field is the main driving force of earnings inequality. The validity and the applicability of these two perspectives in explaining the earnings inequality between the two sources of education are examined.

The two primary research questions concern the rate of mismatch and the consequences of mismatch. A popular conjecture regarding the lower earnings of foreign-educated workers is that foreign-acquired skills are not portable to the U.S. context. This lack of transferability may limit their opportunities to find adequate

employment. Specifically, the *first* question asks whether foreign educated workers are more likely to be mismatched. According to the classical assimilation theory, foreign-educated workers have lower economic outcomes in the labor market because of their lack of U.S.-specific capital. The incongruity between their acquired capital and the required capital of the host context limits their ability to translate their existing skills into career opportunities. The better-assimilated (i.e. the U.S.-educated), on the other hand, have high earnings because of their possession of culturally relevant capital. From the mismatch perspective, mismatch – and not necessarily assimilation – is what contributes to the lower earnings of foreign-educated workers. As conceptualized in the mismatch framework, mismatch is a strategy workers employ to compensate for their labor market deficiencies. As such, foreign-educated workers trade their high educational levels for lower-level jobs to offset their inadequacies associated with their foreign education. A corollary then is that the foreign-educated suffer from higher rates of mismatch than the U.S.-educated population. In both the classical assimilation and labor utilization (i.e. mismatch) framework, the incidence of mismatch is hypothesized to be greater among the foreign-educated.

If mismatch is found to be more prevalent among the foreign-educated, the *second* question asks whether mismatch is the mechanism linking place of education and economic outcomes. From the classical assimilation perspective, the main determinant of earnings inequality is assimilation. In the classical assimilation tradition, when compared to the U.S.-educated population, the foreign-educated will continue to experience disadvantages in labor market outcomes even among those who find adequate employment because of their lower levels of assimilation. In the mismatch framework, education-occupation mismatch in the form of underemployment has economic costs. The matched are better able to utilize their skills, preserving their full productive capacities, ensuring high economic returns. Even the foreign-educated, if matched, should experience positive economic outcomes because of their ability to adequately translate training into occupation.

Horizontal Stratification

The secondary research aim is to present the heterogeneity in training among Asian Americans, and whether the incidence and consequence of mismatch vary by type of training. Income inequality not only stems from source of education ("vertical," so to speak), but also by type of education, with considerable variation across majors (i.e. horizontal stratification, see Gerber and Cheung 2008). Science and engineering (S/E) fields that emphasize technical knowledge are generally considered to be universalistic (Merton 1973[1942]). The ideals of the sciences are objectivity and meritocracy. The nature of the sciences guarantees that the instruction and the practice of science are consistent and transferable cross-culturally. Science is also objective in its hiring and evaluation of workers, where workers are judged on merit alone. Further, because science is technical – in contrast to say, political careers where ascribed characteristics and networks matter – the field is open to all regardless of their location in the social structure. If science is truly a universalistic discipline, then foreign-acquired scientific knowledge should be more transferable to the U.S. context. This transferability should ensure that foreign-trained scientists and engineers encounter a lower rate of mismatch, and if they match, should better reach parity with their U.S.-educated counterparts.

In contrast, non-science and engineering majors are often perceived as teaching "general" education that focuses on cultural and communicative skills, (Kalmijn& van der Lippe 1997), which are location-specific. For instance, training in law and other professional fields teach country-specific knowledge and expertise (Friedberg 2000; Zeng and Xie 2004). While the foreign instruction may be equally rigorous, the country-specific specialization of the subject matter reduces its portability to a different cultural and national context. Therefore, for foreign-trained non-S/E workers, it is expected that they suffer a greater degree of mismatch in the American economy because of the lower level of transferability of their foreign-acquired skills. Also, when matched, foreign-trained non S/E workers may experience more difficulty in converging economically with their U.S.-educated counterparts because of their deficiency in the required U.S.-specific expertise that is inherent in non-S/E occupations.

Data and Methods

This study employs a two-part strategy to explore the levels of mismatch between foreign- and U.S.- educated workers and whether mismatch accounts for the importance of place of education. To address the first question of the presence of mismatch, conditional logit models are run; to determine whether mismatch is the underlying mechanism between place of education and earnings, the classical human capital model in OLS regression is used. The data for both strategies come from the National Survey of College Graduates 2003. The sample is restricted to 25-64 year-old able-bodied full-time[7] foreign-born[8] Asian American males. These restrictions yield a sample of 4,118 individuals (107,068 observations for the conditional logit analysis). The NSCG is an ideal dataset because of the high levels of education obtained by the respondents, and the oversample of Asian Americans.

Definitions of mismatch are varied (Clogg and Shockey 1984). Some measure mismatch in terms of educational training required of the occupation and actual educational training received. Under the assumption that workers choose a field of study with the intention of pursuing that same field in their occupation, mismatch is defined here as incongruence between field of study and field of occupation. Occupational deviation from field of study, regardless of relatedness, is considered mismatch. For instance, an electrical engineering major who becomes a mechanical engineer is equally mismatched as a law major who finds employment in the social services. This framework of movement from major to occupation captures the "stylized model" of immigrant adaptation, where immigrants make a career switch from their field of training for economic adaptation in the host country.

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[7] Because of these restrictions, the estimates might be overly optimistic. It is possible that most of the "mismatch" occurs among those in nonstandard work.

[8] The sample is limited to foreign-born workers because it has been shown that earnings parity with whites is only reached between foreign-born Asian Americans and whites. The inclusion of U.S.-born Asian Americans would bias the results downward, as U.S.-born Asian Americans continue to suffer from lower earnings despite their U.S.-birth and U.S.-based education.

Methods and Variables

Discrete Choice

The first analytic strategy employed to determine mismatch is the conditional logit model. Workers have different preferences and constraints in choosing occupations, so the actual choice they make depends on the choice set available to them. The occupation workers ultimately choose depends not only on their own individual characteristics and their ability to obtain it, but also the characteristics of the occupation, such as how appealing it is (e.g. how much it pays), or how rigorous its requirements (e.g. educational attainment). The choice the individual ultimately makes is contingent on the utility of that particular occupation. For instance, a foreign-educated, medically-trained immigrant worker might want to continue his line of practice in medicine. But the requirements for the occupation require additional U.S.-specific fellowships that the immigrant decides not to invest in at the moment. So instead, the immigrant chooses an occupation that has lower pay but is more readily accessible. Therefore, in modeling an individual's placement into an occupation, it is necessary to consider the occupation itself and also all the other occupational options available to the worker. In this specific case, outcome is the occupation the worker chooses amongst a set of other occupations. The occupations have differing utilities to each individual, and the probability that the workers choose a given occupation is the one that is the most attractive and maximizes their utility. The attractiveness of a particular occupation is contingent on both the observed and unobserved characteristics of the occupation and the worker.

To model discrete choice, it is assumed that all possible choices are known to the individual. The conditional logit model also relies on the assumption of independence from irrelevant alternatives. Imagine a universe of three occupational choices: engineering, computer science and law. This means that the elimination of an occupation, say, engineering, will not lead to a higher probability of choosing computer science than law. Rather, those who would have chosen engineering would be distributed evenly between computer science and law. Realistically, engineering-trained workers would be more likely to enter another science and technology field over a non-technical field.

The first question asks whether workers "shift" from their field of major into a different occupational group, or if they stay. The assumption is that workers prefer to stay put in their field of study rather than move into a different occupational group, and that workers choose majors in anticipation of their desired occupation. This is modeled using the conditional logit model where a set of twenty-six alternatives (see Appendix A[9]) are available to the individual. The modeling of the tendency to move (or "mismatch") follows a strategy proposed by Bruch and Mare (2011), where an indicator D – denoting the respondent's "choice" of major, which is also the variable of interest for mismatch – is included in the equations. Entered alone, this parameter signifies whether there is movement or not. When interacted with individual level characteristics – in this case, the respondent's place of education – it reveals whether U.S.-educated workers are more likely to be mismatched than foreign-educated workers.

Thus, the basic model is shown below, where P_{ik} denotes the probability that the *i*th individual enters the *k*th occupation. X_i is a vector of individual characteristics. To capture "mismatch," a dummy D_{ik} is included, where D_{ik} equals 1 if the worker did not major in the given major category (See Figure 1 for setup of the data). The model is then specified as

$$P_{ik} = \frac{\exp(\alpha D_{ik} + \phi X_i D_{ik})}{\sum_{j=1}^{j} \exp(\alpha D_{ij} + \phi X_i D_{ij})} \quad (1),$$

[9] The original variable in the NSCG 2003 contains 36 categories. For the construction of the 26 categories above, to ensure that education and occupation correspond, occupations that are not listed as majors are assigned to their respective closest majors. For instance, the occupation postsecondary teacher in computer or mathematical sciences does not have a corresponding major, so for an individual who is now a postsecondary computer or mathematical science teacher, his occupation is designated to be the same as his major under the assumption that postsecondary teaching generally requires comparable training. Another occupational field that does not have a corresponding major is S/E manager. Since S/E managers (as opposed to corporate managers) generally come from the ranks of fellow scientists and engineers, an S/E management "major" is created for S/E managers who received S/E training. Also, the categories in life sciences are collapsed into a single life sciences category, and the categories in social sciences are collapsed into a single social sciences category because many of the occupations therein are not represented in the sample.

where J is the set of occupations (=26) available to the workers. To answer the question of whether foreign-educated workers are more likely to be mismatched, the individual level characteristic, place of education, in interacted with the dummy indicator D. To answer the secondary question of whether there is variation by field of training, three models are presented: full sample, S/E-trained, and non S/E-trained.

Variables

Dependent Variable. The dependent variable in the conditional logit model is the *choice* variable which consists of the twenty-six occupational categories (see Appendix A), with the occupation chosen denoted as 1, 0 otherwise. Each individual has twenty-six observations, one for each of the twenty-six occupations available to "choose" from. Of the twenty-six alternatives for each individual, only the occupation that the individual currently occupies is denoted 1; the other twenty-five alternatives are designated 0.

Origin. The origin variable indicates the educational field where the individual received training. The twenty-six educational fields correspond to the twenty-six occupational fields and are ordered similarly. For instance, the first occupational alternative is computer science, and similarly, the first educational option is also designated computer science. Like the dependent variable, for each individual, there are twenty-six educational options. Only one educational field is designated 0, denoting the actual major of the individual. All other educational categories are designated 1. The coding of the *origin* and *choice* variables are complementary to capture mismatch.

Place of Education. Place of education is a binary variable, with 1 denoting U.S. education and 0 denoting foreign education. For each individual, all twenty-six observations have the same place of education designation.

Classical Human Capital Framework

The second step examines whether mismatch is the link between place of education and earnings. The classical assimilation model is employed to assess the role of mismatch in the earnings of Asian workers. The human capital model posits that earnings

is a function of skills and knowledge accrued. The human capital model, at baseline, is specified as

$$y = \alpha + \beta X + \gamma Z + \varepsilon \quad (2),$$

where X contains human capital measures, such as highest degree obtained, field of study, experience and its square term, and Z contains controls variables, such as region and class of worker. The key variable of interest is mismatch, where the respondent receives a 1 for mismatched, and 0 for matched. This variable is entered first additively and then multiplicatively in the model. Similar to the procedure in step one, to test the variation by field of major, separate models are run for the full sample, the S/E sample and the non-S/E sample.

The interaction of "mismatch" and "place of education" reveals whether mismatch "causes" the lower earnings for foreign educated workers. Three possible outcomes are possible. The first is the absence of interaction, suggesting an additive effect of place of education and mismatch. In this situation, the place of education effect is constant across both the matched and mismatched workers. Likewise, the mismatch effect is constant across place of education. The lack of significance of the interaction terms supports the classical assimilation perspective, where the foreign education penalty persists. The second possibility is that the difference in earnings between the foreign-educated and domestic-educated matched is smaller than the mismatched. This supports the mismatch hypothesis, as matching brings the foreign-educated closer economically to the U.S.-educated. The third scenario is where the difference in earnings is actually greater for the matched than the mismatched. This situation suggests the cumulative advantage of two privileged statuses (i.e. U.S. education and "match") and disproves the hypothesis that matching leads to economic equity.

Variables

Dependent Variable. The dependent variable in the human capital framework is the log of salary in the year 2002. The log transformation normalizes the skew evident in the high end distribution of salaries.

Place of Education. Place of education is a binary variable, with 1 denoting U.S. education and 0 denoting foreign education. The place of education variable is the key assimilation variable, with U.S. education as a proxy for greater degree of assimilation, and foreign education, lesser.

Mismatch. The mismatch variable is also a binary variable, with 1 denoting mismatch, and 0 match. As defined above, mismatch is conceptualized as incongruence between major and occupation[10]. The "major" variable (see Appendix B) and the "occupation" variable (see Appendix C) are used to construct the mismatch variable. If the field of major is computer science and the occupation is also computer science, then the mismatch variable is designated 0 (i.e. match). If, however, the major is computer science, but the occupation is electrical engineering, then the mismatch indicator is denoted 1 for mismatch.

Underemployment. Implied in the mismatch debate is the possibility that the mismatch encountered by foreign-educated workers is different from the mismatch encountered by the U.S.-educated population. For foreign-educated workers, mismatch comes in the form of underemployment. The lack of transferability of their foreign-acquired human capital coerces them to seek occupations in which they are overqualified. Mismatch may be different in nature for U.S.-educated workers. In particular, mismatch for U.S.-educated workers may actually be an act of volition, where mismatch is the result of seeking better opportunities or satisfying personal preferences. To control for the likely underemployment experienced by foreign-educated workers, occupational dummies (see Appendix C) are included.

Controls. Controls for the human capital models include 1) *educational degree* (i.e. bachelor's masters, doctorate and professional) to account for potential overeducation between the two sources of education, 2) *major* indicators (see Appendix B) to control for the overconcentration of workers in science and engineering fields, 3) *experience* and its square term to control for labor market-related human capital, 4) *logs of hours* and *log*

[10] There are a few exceptions to this rule. For instance, all postsecondary teachers are assumed to "match." All S/E managers match if they received S/E training.

of weeks worked to control for the finding that Asian Americans overwork as a strategy to succeed economically (Min 1990), 5) a categorical *region* variable (i.e. East, Midwest, South and West) to control for regional variations in earnings, and the overconcentration of Asian Americans along the seaboards, and finally 6) a categorical "*class*" variable, which indicates the "sector" the worker is employed in (i.e. private, self, government or other) to control for the common practice of self-employment as a strategy for economic success.

Results

Descriptive statistics in Table 1 provide information on the proportion of mismatched workers. A higher percentage of foreign-educated workers (64.59%) are mismatched than U.S.-educated workers (54.31%). In terms of the flow of workers from major to occupation[11] for both sources of education, social science majors are the most likely to pursue occupations outside of the social sciences, and computer science and other S/E majors the least likely. On the occupation end, non-S/E workers contain the largest proportion of workers who received training in the same field. Conversely, engineering and physical science occupations have the largest percentage of workers who received similar training. The patterns for foreign-educated and U.S.-educated are generally comparable except for the social sciences: a much lower percentage of foreign-educated social science workers received non-social science training than U.S.-educated.

Human capital variables are described in Table 2. The foreign-educated population is less-educated than the U.S.-educated population, with around 65% of the foreign-educated population holding a bachelor's degree compared to only 34% of the U.S.-educated population. Within source of education, a higher proportion of mismatched workers only hold a bachelor's degree, accounting for three-fourths of the foreign-educated mismatched population, in contrast to 40% of the U.S.-mismatched

[11] Detailed transition matrices with all 26 categories are available but not shown. Results shown are aggregated data for the seven broad categories: computer and mathematical sciences, life sciences, physical sciences, social sciences, engineering, other S/E, non-S/E.

population. Among the advanced degrees held, both foreign-educated and U.S.-educated workers are most likely to hold masters degrees. The higher educational attainment of the U.S.-educated is reflected in their higher earnings. On the whole, U.S.-educated workers have an average salary of close to $75,000, and the foreign-educated population earning $58,000. Likewise, the lower levels of education among the mismatched workers contribute to their lower earnings compared to their matched counterparts, with the difference especially stark among the foreign-educated. A human capital anomaly is the experience statistics: the foreign-educated population has more years of work experience than the U.S.-educated yet still receive lower earnings. For the most part, the descriptive statistics are consistent with the assimilation perspective by showing earnings disadvantages among the foreign-educated, and also with the mismatch hypothesis by revealing the economic penalty to being mismatched.

Table 3 presents the distribution of workers across majors and occupations, and also ratios of salaries between mismatched and matched workers. The distribution of workers indicates that the S/E majors comprise 70% of the population, with engineering the most-studied major among the sciences. However, only 60% of the occupations held by the workers in the sample are in the sciences, suggesting that some of the S/E majors trickled into non-S/E fields. At the same time, while only 12% of the sample majored in computer science, 23% works in the same field, suggesting an influx of non-computer science trained workers occupying computer science occupations. As for earnings, for the most part, workers who were comparably trained have higher earnings than workers from other fields. This is especially evident among U.S.-educated workers. On the whole workers suffer less for finding an occupation that matches their respective majors. The most marked wage penalty for mismatch occurs for foreign-educated social science majors, who only earn about a quarter of their matched counterparts' earnings. While U.S.-educated mismatched social science workers also suffer a wage penalty, they are still able to earn .980 of their matched counterparts in earnings. The mismatch hypothesis holds for the majority of majors, with the exception of the majors in the life sciences, where mismatch actually garners higher wages. The classical assimilation model has partial support: for certain majors, transitioning out of the social sciences, other sciences,

and non-sciences carries strong economic penalty for the foreign-educated. When the flow into occupations is considered, the assimilation case is even stronger: workers occupying jobs in which they did not receive training earn considerably less across the board for foreign-educated workers. The penalty for U.S.-educated workers is more varied; in fact, life and physical science occupations actually have a mismatch premium.

Results for the conditional logit models to test for the hypothesis of greater mismatch among the foreign-educated are presented in Table 4. Mismatch and place of education are captured by dichotomous variables, with the matched and the foreign-educated as reference categories. The occupation variable consists of twenty-six categories with computer science as the reference. The interaction of interest is between mismatch and place of education. Model 1 contains the full sample, and model 2 contains only those with an S/E background, and model 3 only non-S/E. The coefficients for the full model are in the expected direction. The negative mismatch variable indicates that on the whole, a matched occupation is more likely than a mismatched occupation. The negative interaction term indicates that U.S.-educated workers are less likely to be mismatched than foreign-educated. When the sample is restricted to those with S/E majors, the results are similar, supporting the hypothesis that foreign-educated workers are more likely to be mismatched than U.S.-educated workers. However, contrary to the ideals of universalism, the difference in the rate of mismatch between foreign-educated and U.S.-educated non-S/E majors is not significant, seemingly implying that foreign non-S/E training is as transferable as U.S. training.

If on the whole, foreign-educated workers are more likely to be mismatched, and mismatch is predicted to have deleterious economic consequences, can mismatch explain the lower earnings of foreign-educated workers? Table 5 fits three additive models to test the viability of the classical assimilation and mismatch frameworks. Model 1 is the full sample, model 2, the S/E-trained and model 3, the non-S/E-trained. Consistent across the three models is the finding of the lower earnings of foreign-educated workers, with the difference being the greatest among non-S/E majors, which supports the classical assimilation framework. For the mismatch variable, in line with the mismatch hypothesis

of economic disadvantage attached to inadequate employment, mismatched workers earn less than their matched counterparts, and again this difference is the greatest among non-S/E majors. The place of education and mismatch disparities in earnings are the greatest among the non-S/E majors, hinting that perhaps universalism is at work.

The place of education effect on earnings, however, could potentially vary by whether the workers find adequate employment (Table 6). In the full sample (Model 1), returns to foreign education are less than returns to U.S. education. Mismatched workers also earn less than matched workers. The interaction term is significant, indicating differential place of education effects by education-occupation fit. The positive interaction coefficient demonstrates that between the two sources of education, the difference in earnings is greater for the mismatched than the matched, meaning that mismatched foreign-educated workers bear compounding penalties for their two statuses. Or conversely, finding adequate employment and working in a field that is commensurate with training greatly increase the earnings of foreign-educated workers. However, even though the difference in earnings between the two sources of earnings is smaller among the matched, on the whole, foreign-educated workers still cannot reach economic parity.

A different story emerges when the sample is limited to S/E workers only (Model 2). Place of education no longer has a significant effect on earnings when the interaction term is included, but mismatch still has negative bearings on earnings. These results suggest that for S/E workers, when matched, even the foreign-educated can experience economic parity with the U.S.-educated population, supporting the mismatch thesis but casting doubt on assimilation theory. An explanation for the lower earnings of foreign-educated S/E workers can be explained by their lack of education-occupation fit. If these workers can find suitable employment, they do not suffer an economic penalty for their foreign education. In some cases, foreign education may be portable to the U.S. context, and when properly utilized, can lead to economic convergence. However, for the mismatched, economic inequality is still a persistent issue. While matched foreign-educated workers are able to make headway, the unmatched foreign-educated continue to lose ground.

However, the picture is less optimistic for non-S/E workers (Model 3). The penalties attached to foreign education and mismatch persist independently, as the interaction term is not statistically significant. A possible explanation lies in the non-universalistic qualities of these majors. Foreign non-S/E training does not adequately prepare students with U.S.-specific knowledge and skills to become substitutes in the American economy. Therefore, even when foreign-educated non-S/E-trained workers are able to seek employment in their respective fields of study, their foreign-acquired skill sets are not entirely transferable, and as a result, they are penalized for their deficiencies in U.S.-specific capital.

In both the stylized and social science accounts of mismatch, it is assumed that mismatch leads to underemployment. To test whether mismatch is a result of underemployment, occupational dummies are included in the final analysis (Table 7). The differences in earnings between the matched and mismatched for the two sources of education are compared before (Table 6) and after the inclusion of controls. If underemployment is driving the earnings penalty for mismatched foreign-educated workers, the difference in earnings should be bigger *before* the inclusion of controls. For the full sample, when occupation is controlled for, the difference between mismatched workers is reduced by close to 48%, as opposed to a 19% *gain* for the matched. The pattern is similar for S/E workers, though of a greater magnitude: the difference between mismatched is reduced by 25%, but the *gain* for matched is 69%! The difference between the two sources of education lessens for the mismatched when occupational dummies are included, suggesting that underemployment contributes to the earnings disparity between U.S.- and foreign-educated mismatched workers. It is plausible that when the U.S.-educated are "mismatched," the *meaning* of mismatch differs. "Mismatch" for U.S.-educated workers may take the form of lateral or upward movement, while "mismatch" for foreign-educated workers takes the form of inadequate employment. The *gain* in economic disparity between the "matched" workers suggests that foreign-educated workers seek "overemployment" to reach economic parity, meaning that when foreign-educated workers "match," they match in fields that yield exceptionally high earnings. In sum, being matched or unmatched has less economic bearing on U.S.-educated workers.

For the foreign-educated, though economic parity can be reached for those who seek adequate employment, equality comes at the cost of "overemployment."

Discussion and Conclusion

The immigrant human capital model rooted in the classical assimilation framework assumes that as immigrants become "American" and acquire host-country skills, differences between the foreign and native populations will diminish and eventually disappear. This perspective assumes that human capital and cultural traits need to become comparable in order for immigrants to have similar life chances and outcomes. However, this analysis provides a different portrait of immigrant economic adaptation: immigrants do not have to be on par in terms of assimilation to have similar economic outcomes. Immigrants can narrow the gap between the more-assimilated and the less-assimilated without gaining (measurable) U.S.-specific capital.

There is much variation even within the foreign-educated population. Acquisition of foreign education is not evenly disadvantageous, and the economic consequences of foreign education vary by whether workers work in a related field or in occupations that are not commensurate with their training. Foreign-educated workers have a higher probability of mismatch, and much of the earnings differential between the two sources of education can be traced to foreign-educated workers being mismatched. Within the foreign-educated, there is a significant earnings disparity between the matched and the mismatched. The large discrepancy in earnings between the two suggests that finding adequate work is important for the economic well-being of foreign-educated workers. In fact, foreign-educated workers do not suffer a significant earnings disadvantage compared to U.S.-educated among the well-placed workers.

The mismatch framework adequately explains the earnings disparity between foreign- and domestic-educated, but only for S/E-trained workers. It appears that different mechanisms are at work for S/E- and non-S/E majors. At least for foreign-educated S/E majors, finding adequate employment guarantees earnings parity. Because S/E is idealized to be universalistic and objective, scientific knowledge and skills are

standardized and consistent across origins. Because of this integral quality of the sciences, U.S.-specific social, cultural and linguistic skills have little or no bearing on the earnings of S/E workers. If foreign-trained S/E majors can find adequate employment in S/E occupations, where merit is based solely on hard skills and not on cultural proclivities that are unique to the host context, it is possible for them to no suffer an earnings penalty for their foreign education. However, the plight of non-S/E majors is different. It is believed that non-S/E training imparts soft skills that are context specific; therefore foreign-acquired training in comparable fields does not equate comparable expertise, as much of the foreign training is lost in translation. When matched, non-S/E foreign-educated workers continue to suffer an earnings penalty, suggesting the enduring importance of assimilation for non-S/E work.

U.S. education still accrues many benefits. U.S.-educated workers on the whole have higher earnings and are more likely to find adequate employment. Even for the mismatched, U.S.-educated workers do not suffer a considerable earnings penalty compared to their matched counterparts, suggesting that domestic mismatch does not necessarily involve underemployment. In contrast, foreign-educated workers are more likely to find employment in a field outside of their field of study, and when they do, their "mismatch" more often takes the form of underemployment. Meanings attached to mismatch then differ by place of education. For foreign-educated workers, mismatch may be a strategy for economic survival in the host country. But for U.S.-educated workers, mismatch may be based on personal preferences for better pay or job satisfaction.

Further, the mismatch framework also needs to be interpreted with caution. Firstly, economic parity is only achievable for S/E workers. Secondly, while foreign-educated S/E workers are able to reach economic parity, when occupational controls are included, it is revealed that parity is reached because foreign-educated "matches" are overrepresented in occupations that are high-paying. In analysis not shown, when matched, foreign-educated workers are most likely to be in health-related field where compensation is among the highest ($~107,000). In contrast, when matched, U.S.-educated workers are most likely to hold computer science positions that average $83,000

annually. The widening of the earnings disparity between the two sources of education with the inclusion of occupational indicators suggest that true economic parity has yet to be reached, as foreign-educated workers can only reach economic parity through overemployment. When occupations are taken into consideration, place of education still matters.

Both demand- and supply-side stories can explain the wage penalty for foreign, mismatched worker. Rapid economic and technological changes began to occur in the 1970s. Technological upgrading and a shift to the service sector dismantled the old manufacturing-based economy, hollowed out jobs in the middle, and gave way to a new a bifurcated economy (see Bound and Johnson 1992). If mismatch is some kind of compensation for deficiency in human capital (Sicherman 1991), foreign-educated immigrants may encounter extreme difficulty in finding fitting jobs. In the new hourglass economy, for immigrants who are unable to find adequate employment, there is no "buffer" for them to fall back on, so they resort to low-paying occupations. Since workers are rewarded not for their actual qualifications but by the requirements of the occupation, workers who are underemployed receive lower wages. Upon entry to the United States, foreign-educated immigrants must start anew their work life cycle. Since they are lacking in U.S.-specific human capital, they are especially susceptible to mismatch.

From a supply-side perspective, not all workers are the same. As the Asian American population is marked by considerable heterogeneity, likewise, the foreign-educated are also remarkably diverse within. As the economy becomes more global, employers increasingly rely on foreign-educated workers to fill vacant posts. Many of these workers are "selected" into the American labor market because of demonstrated competence in their home country. If talent are being sought abroad, and talent are being selected to work precisely for occupations that they exhibited competence in, then talent will work in occupations in which they were trained. Thus, foreign-educated "matched" workers could be intrinsically different from their unmatched counterparts. What "mismatch" is capturing then is not the effects of placement, but rather, how workers who are selected to "stay" in their occupation or forced to "move" upon arrival are different

on unobserved characteristics. Matching is then confounded with being a good worker, or the mechanism that induces immigration. For instance, family reunification immigrants may look very different from work visa immigrants. Though there is still much to be explored, the findings in the study point to the importance of adequate employment to avoid economic disadvantage, especially among foreign-educated workers.

Figure 4. Data Setup

	ID	Occupation	Major	Outcome	Mismatch	Place of Education
Computer scientist	1	2	1	0	0	1
Mathematical scientist	1	2	1	1	1	1
Life scientist	1	2	1	0	1	1
Chemist	1	2	1	0	1	1
Earth and atmospheric scientist	1	2	1	0	1	1
Physicist	1	2	1	0	1	1
Other physical and related scientist	1	2	1	0	1	1
Social scientist	1	2	1	0	1	1
Aerospace engineer	1	2	1	0	1	1
Chemical engineer	1	2	1	0	1	1
Civil engineer	1	2	1	0	1	1
Electrical and computer engineer	1	2	1	0	1	1
Industrial engineer	1	2	1	0	1	1
Mechanical engineer	1	2	1	0	1	1
Other engineering	1	2	1	0	1	1
Health-related	1	2	1	0	1	1
S/E manager	1	2	1	0	1	1
Teacher – S/E	1	2	1	0	1	1
S/E technician and technologist	1	2	1	0	1	1
Other S/E related	1	2	1	0	1	1
Management-related	1	2	1	0	1	1
Teacher – non-S/E	1	2	1	0	1	1
Social services and related	1	2	1	0	1	1
Sales and marketing	1	2	1	0	1	1
Arts, humanities and related	1	2	1	0	1	1
Other non S/E	1	2	1	0	1	1

Notes: Occupation 2 is mathematical scientist. Major 1 is computer science. Outcome 1 denotes the occupation the respondent is currently holding. Mismatch 0 denotes the major studied. Place of education 1 indicates US education.

Table 4.1. Descriptive Statistics of Mismatch

	All	Foreign Educated	US Educated
% Mismatched	58.68	64.59	54.31
Index of Dissimilarity	0.244	0.300	0.203
College Major	% Outflow	% Outflow	% Outflow
Computer and Mathematical Sciences	32.65	32.4	32.77
Life Sciences	56.46	49.33	61.08
Physical Sciences	70.63	79.29	60.34
Social Sciences	93.09	96.02	89.12
Engineering	68.13	78.87	61.47
Other Sciences	34.12	36.11	32.25
Non S&E	64.97	71.22	60.25
Occupation	% Inflow	% Inflow	% Inflow
Computer and Mathematical Sciences	65.1	70.57	61.51
Life Sciences	30.51	33.12	28.12
Physical Sciences	28.93	24.1	31.73
Social Sciences	60.7	33.58	67.32
Engineering	37.89	42.5	36.29
Other Sciences	38.34	40.22	36.52
Non S&E	74.38	80.88	68.51

Data: NSCG 2003. N=4,118.

Table 4.2. Descriptive Statistics of Variables

	Foreign			Domestic		
	All	Matched	Mismatched	All	Matched	Mismatched
Level of Education						
% Bachelors	65.98	47.43	76.15	34.29	27.19	40.26
% Masters	19.04	20.08	18.47	44.69	43.48	45.71
% Doctorate	6.28	10.91	3.74	15.75	18.24	13.65
% Professional	8.7	21.57	1.64	5.27	11.09	0.37
Mean Log of Salary	10.959	11.209	10.821	11.216	11.271	11.170
Mean Log of Hours Worked	3.813	3.838	3.800	3.836	3.828	3.842
Mean Log of Weeks Worked	3.946	3.945	3.946	3.946	3.945	3.946
Mean Years of Experience	19.979	19.865	20.042	11.332	10.975	11.632

Data: NSCG 2003. N= 4,118.

Table 4.3. Ratio of Earnings (Mismatched: Matched)

Major	Composition	All	Foreign-educated	US-educated
Computer and Mathematical Sciences	12.08	0.947	0.993	0.923
Life Sciences	6.00	1.224	1.056	1.436
Physical Sciences	5.02	0.964	1.086	0.889
Social Sciences	5.08	0.852	0.245	0.980
Engineering	27.72	0.941	0.984	0.932
Other Sciences	14.95	0.661	0.540	0.811
Non S&E	29.15	0.768	0.735	0.899
Occupation				
Computer and Mathematical Sciences	22.70	0.813	0.863	0.788
Life Sciences	3.45	1.058	0.765	1.255
Physical Sciences	1.97	0.935	0.945	1.081
Social Sciences	0.79	0.644	0.518	0.912
Engineering	13.46	0.915	0.854	0.993
Other Sciences	17.46	0.654	0.590	0.721
Non S&E	40.17	0.764	0.726	0.862

Data: NSCG 2003. N=4,118.

Table 4.4. Conditional Logit Models of Major-Occupation Mismatch

	All		S/E		Non S/E	
	Coef				Coef	
Move	-3.012 ***	0.052	-3.142 ***	0.057	-2.235 ***	0.144
Move*Place of Education	-0.230 ***	0.065	-0.235 **	0.071	-0.260	0.176
Model X^2	7493.03		7005.13		582.53	
df	2		2		2	
Obs	107,068		89,622		17,446	

+p<.10, *p<.05, **p<.01, ***p<.001

Table 4.5. Estimated Regression Coefficients of Log of Earnings for Asian Immigrants

	All		S&E		Non S&E	
	Coef	SE	Coef	SE	Coef	SE
Place of Education						
US Education	0.235 ***	0.034	0.146 ***	0.028	0.479 ***	0.097
Mismatch						
Mismatch	-0.118 ***	0.030	-0.100 ***	0.024	-0.172 *	0.071
Degree						
Masters	0.194 ***	0.034	0.140 ***	0.035	0.243 ***	0.074
Doctorate	0.291 ***	0.036	0.319 ***	0.035	0.296 ***	0.107
Professional	0.458 ***	0.079	0.616 ***	0.088	0.119	0.148
Major Dummies	24 coefficients		18 coefficients		5 coefficients	
Work Experience						
Experience	0.032 ***	0.005	0.043 ***	0.004	0.020 +	0.012
Experience^2	-0.001 ***	0.000	-0.001 ***	0.000	0.000	0.000
Employment						
Log of hours worked	0.616 ***	0.079	0.452 ***	0.087	0.931 ***	0.163
Log of weeks worked	-0.192	0.747	0.065	0.789	-0.559	1.737
Region						
Midwest	-0.041	0.037	-0.064 +	0.037	-0.037	0.090
South	-0.120 **	0.044	-0.151 ***	0.043	-0.115	0.104
West	-0.032	0.034	-0.018	0.032	-0.087	0.078
Class						
Self	0.080 *	0.040	0.101 *	0.042	0.079	0.078
Government	-0.093 *	0.043	-0.146 **	0.045	0.021	0.090
Other	0.293 *	0.149	0.230	0.167	0.486 +	0.276
Constant	9.187	2.930	8.807 **	3.110	8.889	6.844
R^2	26.88		26.16 **		31.58	
Obs	4, 118		3,447		671	

+p<.10, *p<.05, **p<.01, ***p<.001

Table 4.6. Estimated Regression Coefficients of Log of Earnings for Asian Immigrants with Interaction

	All		S&E		Non S&E	
	Coef	SE	Coef	SE	Coef	SE
Place of Education						
US Education	0.120 **	0.040	0.049	0.031	0.400 **	0.133
Mismatch						
Mismatch	-0.238 ***	0.049	-0.207 ***	0.041	-0.243 *	0.120
Interaction						
Place of Edu*Mismatch	0.191 ***	0.053	0.169 **	0.050	0.115	0.139
Degree						
Masters	0.189 ***	0.034	0.134 ***	0.035	0.243 **	0.074
Doctorate	0.285 ***	0.036	0.311 ***	0.035	0.299 **	0.108
Professional	0.449 ***	0.078	0.602 ***	0.088	0.126	0.150
Major Dummies	24 coefficients		18 coefficients		5 coefficients	
Work Experience						
Experience	0.032 ***	0.005	0.042 ***	0.004	0.020 +	0.012
Experience^2	-0.001 ***	0.000	-0.001 ***	0.000	0.000	0.000
Employment						
Log of hours worked	0.605 ***	0.077	0.440 ***	0.086	0.929 ***	0.162
Log of weeks worked	-0.225	0.729	-0.017	0.774	-0.498	1.703
Region						
Midwest	-0.040	0.037	-0.062 +	0.036	-0.036	0.089
South	-0.122 **	0.043	-0.150 ***	0.042	-0.118	0.105
West	-0.032	0.034	-0.017	0.031	-0.089	0.078
Class						
Self	0.077 +	0.039	0.097 *	0.041	0.077	0.078
Government	-0.102 *	0.043	-0.152 **	0.045	0.014	0.090
Other	0.286 +	0.159	0.240	0.166	0.467	0.297
Constant	9.439 **	2.862	9.246 **	3.044	8.721	6.714
R^2	27.42		26.64		31.74	
Obs	4, 118		3,447		671	

+p<.10, *p<.05, **p<.01, ***p<.001

Table 4.7. Estimated Regression Coefficients of Log of Earnings for Asian Immigrants with Occupational Indicators

	All		S&E		Non S&E	
	Coef	SE	Coef	SE	Coef	SE
Place of Education						
US Education	0.144 ***	0.037	0.082 **	0.031	0.391 **	0.117
Mismatch						
Mismatch	-0.112 **	0.048	-0.096 *	0.041	-0.038	0.126
Interaction						
Place of Edu*Mismatch	0.099 *	0.049	0.081 +	0.047	-0.008	0.127
Degree						
Masters	0.148 ***	0.031	0.099 **	0.034	0.187 **	0.065
Doctorate	0.299 ***	0.035	0.312 ***	0.036	0.324 **	0.114
Professional	0.501 ***	0.078	0.536 ***	0.095	0.356 *	0.146
Major Dummies	24 coefficients		18 coefficients		5 coefficients	
Occupation Dummies	29 coefficients		28 coefficients		21 coefficients	
Work Experience						
Experience	0.032 ***	0.005	0.041 ***	0.004	0.019 +	0.011
Experience^2	-0.001 ***	0.000	-0.001 ***	0.000	0.000	0.000
Employment						
Log of hours worked	0.639 ***	0.077	0.488 ***	0.086	0.952 ***	0.154
Log of weeks worked	-0.227	0.661	-0.015	0.723	-0.693	1.508
Region						
Midwest	-0.047	0.034	-0.060 +	0.035	-0.063 *	0.087
South	-0.135 ***	0.038	-0.137 ***	0.038	-0.182	0.090
West	-0.036	0.031	-0.018	0.031	-0.088	0.072
Class						
Self	0.053	0.037	0.081 *	0.039	0.044	0.077
Government	-0.087 *	0.043	-0.105 *	0.046	-0.024	0.094
Other	0.238 *	0.107	0.182	0.157	0.397 **	0.135
Constant	9.378 ***	2.585	9.088 **	2.820	9.759	5.988
R^2	37.51		35.09		44.69	
Obs	4, 118		3,447		671	

+p<.10, *p<.05, **p<.01, ***p<.001

Appendix A: “Choices” in the Conditional Logit Models	
1	Computer scientist
2	Mathematical scientist
3	Life scientist
4	Chemist
5	Earth and atmospheric scientist
6	Physicist
7	Other physical and related scientist
8	Social scientist
9	Aerospace engineer
10	Chemical engineer
11	Civil engineer
12	Electrical and computer engineer
13	Industrial engineer
14	Mechanical engineer
15	Other engineering
16	Health-related
17	S/E manager
18	Teacher – S/E
19	S/E technician and technologist
20	Other S/E related
21	Management-related
22	Teacher – non-S/E
23	Social services and related
24	Sales and marketing
25	Arts, humanities and related
26	Other non S/E

Appendix B: Educational Categories for OLS Regression

Computer and Mathematical Sciences
- Computer science (1)
- Mathematical science (2)

Life Sciences (3)

Physical Sciences
- Chemistry (4)
- Earth and Atmospheric Sciences (5)
- Physics (6)
- Other physical sciences (7)

Social sciences (8)

Engineering
- Aerospace engineering (9)
- Chemical engineering (10)
- Civil engineering (11)
- Electrical engineering (12)
- Industrial engineering (13)
- Mechanical engineering (14)
- Other engineering (15)

Other S/E
- Health-related fields (16)
- S/E Teacher education (17)
- Technology and technical (18)
- Other S/E (19)

Non-S/E
- Non-S/E Teacher education (20)
- Management (21)
- Social services (22)
- Sales and marketing (23)
- Arts and humanities (24)
- Other non-S/E (25)

Note: Major indicators are numbered in parentheses.

Appendix C: Categories for Occupational Indicators

- Computer and Mathematical Sciences
  - Computer sciences (1)
  - Mathematical sciences (2)
  - Postsecondary teacher in computer or mathematical sciences (3)
- Life and related sciences (4)
- Physical Sciences
  - Chemistry (5)
  - Earth or atmospheric sciences (6)
  - Physics (7)
  - Other physical sciences (8)
  - Postsecondary teacher in the physical sciences (9)
- Social sciences (10)
- Engineering
  - Aerospace engineering (11)
  - Chemical engineering (12)
  - Civil and architectural engineering (13)
  - Electrical and computer engineering (14)
  - Industrial engineering (15)
  - Mechanical engineering (16)
  - Other engineering (17)
  - Postsecondary teacher in engineering (18)
- Other S/E
  - Health-related (19)
  - S/E manager (20)
  - Pre-college teacher in S/E (21)
  - Technology and technical fields (22)
  - Other S/E (23)
- Non-S/E
  - Management and administration (24)
  - Postsecondary teacher in non-S/E (25)
  - Pre-college teacher in non-S/E (26)
  - Social services (27)
  - Sales and marketing (28)
  - Arts and humanities (29)
  - Other non S/E (30)

Note: Occupational indicators are numbered in parentheses.

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CHAPTER 5

CONCLUSION

Much social science research has been devoted to resolving the persistent wage penalty associated with immigration. The stylized classical assimilation perspective, in which much of the established immigration literature is rooted, attempts to explain away the earnings disparity through human capital and assimilation deficiencies in the immigrant population. Through Americanization – the acquisition and accumulation of U.S.-specific skills and practices – immigrants are expected to assimilate into American society and eventually reach economic convergence with natives.

With the influx of immigrants to the United States since the 1960s, the economic integration of immigrants into the labor market has received renewed interest in social science and public policy research. The Immigration Act of 1965 ushered in a new wave of immigrants that are categorically different from the old in terms of race and socioeconomic status. Though broad strokes, the general consensus among scholars is that the immigrants of old were largely of European origin and occupied the bottom rungs of the economic totem pole, while the new are overwhelmingly from Asia and Latin America and of extreme socioeconomic diversity. Such shifts in the demographic composition of the immigrant pool have presented new patterns of incorporation into American society, challenging previous understandings of immigrant economic adaptation.

Critics of the classical assimilation approach are most vocal against the value-laden assumption that assimilation is desirable and that it inevitably leads to positive outcomes. From a human capital perspective, it is argued that the new immigrants are of a lower stock, and because of their limited resources and skill sets, it is unlikely that they

will ever reach economic parity with natives even with assimilation (Borjas 1994). From a sociological perspective, the immigrant population and the contexts that receive these immigrants are marked by considerable diversity, and the individual and the structural interact to jointly determine immigrant economic incorporation into American society. For low-skilled poor immigrants living into hostile environments, assimilation may lead to disarticulation from mainstream values, deleterious behaviors, and decreased morale. Contrary to the tenets of classical assimilation theory, retaining ethnic ties and cultural practices may actually be a protective mechanism against possible downward assimilation associated with Americanization (Portes and Zhou 1993). Research on the fragility of classical assimilation among today's immigrants has largely focused on low-skilled immigrants, and the effects of assimilation on their adaptation into U.S. society. For these immigrants, assimilation is not only futile but also detrimental. However, little attention has been focused on high-skill immigrants and the effects of assimilation on their prospects in the host country.

The heterogeneity in earnings even within the Asian American population challenges conventional understandings of race in the U.S. racial hierarchy. Recent findings have highlighted the declining significance of race and the importance of personal characteristics, namely degree of assimilation and stock of human capital. The new thread of literature that has emerged draws attention to the salience of place of education in the earnings of immigrants, providing some closure to the longstanding Asian American overeducation paradox (Hirschman and Wong 1984). But the close of a scholarly chapter ignites new debates. What remains unclear is why some Asian Americans are able to pull ahead while some continue to lag behind.

If place of education is the main driving factor in the earnings disparity *within* the Asian American population, what is it about place of education that produces the observed wage gap? The classical assimilation answer would be that the foreign-educated are less assimilated. Foreign education does not provide students with comparable English language training or expose them to enough American culture for social and linguistic proficiency. These skills that can only be acquired while immersed in U.S.

education and context set the foreign- and domestic-educated apart. Because of the specific skill sets it provides, U.S. education is considered more valuable and usable in the U.S. economy, resulting in higher earnings among the U.S.-educated despite sharing commonalities in race and nativity with the foreign-educated.

However, as with other post-industrial societies, the U.S. economy is increasingly reliant on foreign-trained labor, as evidenced in the growth in work-based visas (INS 2004). This demand for foreign labor suggests that there may be instances where foreign education is just as valuable in the American labor market. Studies have shown that foreign education is differentially transferable (Jasso and Rosenzweig 1990). As developing nations become more "developed," their educational quality is assumed to rise in accordance. In fact, international standardized tests demonstrate that many Asian nations are outperforming the U.S. in the sciences, suggesting that foreign education may even surpass U.S.-based education (see Xie and Killewald, forthcoming for review). Also, with globalization, American culture has become more accessible to foreign countries, and may even become incorporated into indigenous cultures, blurring the East-West divide. If so, it is plausible that the foreign education penalty is not as universal as suggested in previous studies. The three articles in the dissertation attempt to reveal anomalous patterns to the classical assimilation understanding of immigrant economic adaptation.

The first paper examines the penalty of foreign education by ethnicity among postsecondary foreign-born Asian American workers. Using primarily data from the 2000 Census Public-use Microsample, it employs two complementary analyses. The first is in the standard human capital framework, where earnings is a function of human capital and assimilation. In the standard human capital framework, which essentially replicates past studies, the results are as expected. Foreign education leads to lower earnings with the exception of Japanese immigrants, who not only are able to reach parity but even surpass the U.S.-educated in earnings. Such is not surprising as most Japanese immigrants are not "true" immigrants, but human capital immigrants who are dispatched by Japanese multinationals to fill supervisory positions in the United States. These workers are

insulated from the human, cultural and social capital demands of the American labor market. While assimilation may still be necessary for economic mobility in the open labor market, in the case of Japanese Americans operating under a different regime, non-assimilation does not bear significant economic penalties.

However, the standard additive human capital framework fails to account for preexisting differences in country-specific skills that immigrants may possess. For instance, workers from origins that are of closer economic and cultural proximity to the U.S. may possess a larger reserve of U.S.-specific capital though lacking formal U.S. education. To account for origin-specific heterogeneity, the difference-in-differences framework is proposed. The high school education group is introduced as a benchmark for the country-specific capital workers possess, which is conceptualized to be invariant across levels of education. Under this assumption, the differences in earnings between the foreign- and domestic-educated at the bachelor's, masters, doctorate and professional levels are juxtaposed to the difference in earnings between the two sources at the high school level.

Using the DID strategy, the origin-specific human capital is differenced out. In this framework, foreign education is not universally penalized, especially at lower levels of education. In fact, Indian workers even have a foreign education premium at the college level. These findings shed light on the transferability of foreign skills at various educational levels and gives credence to the assumption that general skills acquired at lower levels of education are more transferable. In light of the current global economy and the U.S. economy's heavy demand of foreign-trained labor, especially Indian science and engineering workers, the foreign college education premium for Indian men suggest that structural characteristics are also at work.

The second paper asks the question of whether immigrants who are screened for skills are able to reach economic parity. It is assumed that a large part of the lower earnings of the foreign-educated can be attributed to the lack of portability of their skills. Foreign-acquired capital, though comparable in name, may differ in kind from U.S.-acquired capital. If the foreign-acquired capital has been vetted and approved through the

issuance of a work visa, it is possible that foreign-acquired education is just as usable in the American economy, and as such, does not suffer a penalty. To this end, this paper examines the role of work visa in the earnings of foreign-educated workers by stratifying the foreign-educated sample into work visa and non-work visa holders. The earnings of work visa holders are compared against the earnings of U.S.-educated workers. Likewise, the earnings of non-work visa holders are compared against that of U.S.-educated workers. Results indicate that work visa holders are able to reach economic parity with the U.S.-educated population, challenging the assumption that assimilation – in the form of U.S. education – is necessary for positive outcomes. For foreign-educated workers who were not screened for compatible skills upon first entry to the U.S., their earnings are lower than their U.S.-educated counterparts. For these workers, assimilation is still relevant to their economic attainment.

Given the current global economy and the increasing demand of foreign-trained labor, especially in the sciences and engineering (S/E), the economic outcomes of S/E workers are also considered. Per the universalistic ideals of the sciences, S/E is governed by standardized, technical knowledge that is invariant across national boundaries; S/E training received abroad is the same in theory as domestic S/E training. The consistency of S/E training across the board suggests that it is of greater portability to a different cultural and national context than other forms of training. Therefore, what work visa is capturing is not necessarily the sorting mechanism for qualified workers. Since the majority of work visa holders are S/E workers, work visas may actually be confounded with S/E training. To account for possible omitted variable bias and to examine whether the place of education effect on earnings varies by visa type *and* training, an interaction term of place of education and major (i.e. S/E or non-S/E) is included in each of the stratified models. If universalism holds, then S/E workers, regardless of visa type, should all reach economic parity. If work visa is a foolproof screen and guarantees perfect substitution, then work visa holders, regardless of major, should all reach economic parity. Results indicate, however, that work visa and S/E training jointly accrue compounding advantages. In fact, for S/E work visa holders, there is actually a foreign education premium! Work visa non-S/E workers and non-work visa S/E workers both

continue to lag behind. These findings shed light on the macro and micro interplay in Asian American earnings, and the dispensability of the classical assimilation approach for high-skilled immigrants.

The third empirical paper aims to find the mechanism linking foreign education and lower earnings. If foreign education is deemed of lesser quality, hence not portable to the U.S. context, perhaps foreign-educated workers are more likely to encounter education-occupation mismatch. If so, mismatch could possibly explain the lower earnings of foreign-educated workers. To achieve this, the first part of the paper asks whether foreign-educated workers are more likely to be mismatched by using conditional logit models. The second part models immigrant earnings using the standard human capital framework and includes an interaction term of place of education and mismatch to allow for the effects of place of education to vary by whether workers find adequate employment.

Previous studies have found that less-assimilated immigrants experience a higher incidence of mismatch, and that mismatch leads to negative economic outcomes. This study, for the most part, finds similar results. Foreign-educated workers are more likely to be mismatched, but this is only true for science and engineering workers. For non-S/E workers, foreign-educated workers are not significantly more likely to seek employment outside their respective fields of study.

The OLS models in part two of the study shed light on whether mismatch accounts for the foreign education penalty. For S/E-majors, lack of education-occupation fit results in lower earnings, but for those who are able to find employment that is relevant to their respective academic disciplines, economic convergence is achieved. When mismatch is considered, place of education is no longer of consequence for foreign-educated workers. The ability of foreign-educated workers to have comparable earnings with U.S.-educated workers implies that assimilation is not of paramount necessity in the economic achievement of today's immigrants. For those whose skills are adequately employed, even their foreign-acquired skills can reap high earnings. However, a different mechanism seems to be at work for non-S/E majors. For non-S/E majors,

even when mismatch is considered, foreign-educated workers continue to suffer from negative place of education effects.

A large piece of the mismatch puzzle is the underemployment of foreign-educated mismatched workers. When occupational controls are included to account for possible underemployment, the gap between foreign- and domestic-educated mismatched workers narrow, suggesting that foreign-educated mismatched workers encounter greater underemployment. However, for the matched, the inclusion of occupational dummies results in larger disparities between the two sources of education. With occupational controls, foreign-educated matched workers now earn significantly less than their U.S.-educated counterparts, suggesting that the guise of economic parity was largely due to the "overemployment" of foreign-educated matched workers.

On the whole, all three essays point to the declining significance of assimilation in explaining the economic outcomes of high-skill immigrants. For those who are equipped with marketable skills, assimilation is not required for economic convergence. Foreign education, though inherently lacking in U.S.-specific capital, does not uniformly translate into lower earnings. However, while these findings argue that assimilation is not always crucial for economic assimilation, all three papers voice the same caveat – economic convergence in the absence of "assimilation" is only attainable for a very small population. Many, such as non-Indian and non-Japanese workers (Chapter 2), non-work visa holders and non-S/E-trained workers (Chapter 3), and mismatched workers (Chapter 4), are still economically disadvantaged in the absence of assimilation. Moreover, even among the "advantaged," such as matched S/E-trained workers (Chapter 4), economic parity, while achieved, comes at the cost of overemployment. It appears that while on the surface convergence is achieved, it is sometimes only possible through overcompensation.

Future directions of research on immigrant adaptation should continue to unearth the heterogeneity within the Asian American population. The current immigrant landscape is marked by much diversity in terms of origin and socioeconomic status. Further muddying the understanding of immigrant incorporation is that macro-structural

factors are also at work. Immigrants are differentially selected to immigrate, as immigration is a costly endeavor. Some immigrants migrate for family reunification, some for work, and some for asylum. These three populations are different, and they have distinct histories and resources that motivate their decision to immigrate and influence their economic adaptation. The macro-structural processes that motivate immigration are an often ignored aspect of immigration. To better capture the patterns of immigrant adaptation today, a consideration of the *decisions* and *mechanisms* of migration is necessary.

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