The Earnings of Foreign-Educated College Graduates

An Examination of the Determinants of the Hourly Earnings of College-Educated Immigrants

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Introduction

Our research project on the underutilization of immigrant professionals is designed to identify and estimate the degree of labor market underutilization among immigrant workers with a college degree. We have proposed to measure underutilization that occurs at three points along the pathway to employment: at the time of entry into the labor market, after an individual has entered the labor market, and after an individual has secured employment. Underutilization at the time of entry into the labor market occurs in the form of low levels of participation in the labor market. An individual is considered in the labor force when he/she is willing and able to work and are either working, temporarily laid off from a job, or are actively looking for work. The first type of underutilization in the labor market occurs in the form of low levels of participation in the labor market.

Individuals who enter the labor market are willing and able to work. If they are unable to find employment their skills and abilities are not utilized in the labor market. Unemployment is therefore another form of underutilization in the labor market. It occurs only after an individual has decided to enter the labor market and is willing and able to work but not able to find employment. Underutilization can also occur after an individual has secured employment. We will measure two types of underutilization that occurs among those who are employed. The first type of underutilization among the employed occurs in the form of involuntary part-time employment. If an employed individual wants to work in a full-time job but is working in a part-time job because he/she unable to find a full-time job, that person is involuntarily employed in a part-time job and is therefore underutilized in the labor market. The second type of underutilization among the employed is specific to college graduates and occurs when a college graduate is employed in a job that does not utilize the skills and abilities that are acquired with a college education. This type of underutilization is called mal-employment.

As noted above, the first step into the labor market consists of entry into the labor market. One has to enter the labor market in order to participate in the labor market by either working or by actively looking for work. College-educated immigrants who do not enter the labor market clearly do not avail themselves of the opportunity to utilize their education and human capital in the American labor market. Lower rates of labor market participation are therefore one measure of labor market underutilization among college-educated immigrants.

Although the labor supply decisions of individuals are based on many variables, the economic theory of labor supply and most observers of the labor market consider the expected wage to be one of the key determinants of the decision to work. How do individuals decide whether to participate in the labor market? According to the economic theory, individuals distribute the finite amount of time per day (24 hours) between leisure and other non-work activities and work in order to earn income. In order to gain additional income, individuals have to tradeoff leisure for work conversely in order to have an additional hour of leisure individuals have to tradeoff earnings. The expected wage in the labor market can therefore be considered the price of leisure.

An individual's decision to participate in the labor force is based on their subjective preferences for the rate at which they would trade leisure and for earnings. The decision to work entails a sacrifice of leisure and time spent on non-work activities which is considered to be the opportunity cost of participating in the labor market. Based on individual preferences each individual has a certain wage below which he/she will not be willing to trade leisure time. This wage is called the 'reservation wage' and is based on the value that an individual places on leisure. If the expected wage in the labor market exceeds an individual's reservation wage, the individual will enter the labor market and conversely, if the expected wage is lower than the reservation wage, the individual will not participate in the labor market.

The expected wage is an important determinant of the labor force participation decision of individuals. The degree of underutilization in the form of low levels of labor force participation among college-educated immigrants will require a good understanding of the wages of college-educated immigrants including an understanding of the determinants of their wage. In this paper, we present findings from a descriptive analysis of the hourly wages of immigrant professionals followed by a multivariate regression analysis to estimate the predictors of the hourly wages of all college-educated immigrants.

The analysis in this paper is designed to shed important light on the level and variation in the hourly wages of different demographic subgroups of college-educated immigrants as well as subgroups of immigrants with different kinds and levels of human capital. The regression analysis of the hourly wages will also allow the estimation of imputed wages for all (employed and not employed) college-educated immigrants. The imputed wage will be used on in our

analysis of the labor force participation among college-educated immigrants. This analysis also allows an assessment of the channels through which the human capital traits of immigrants influence their labor supply behavior. For example, if we find that the English language proficiency of immigrants has no effect on the likelihood of immigrants to participate in the labor force but the hourly wage regression analysis finds that the English language proficiency of immigrants has a strong and positive effect on their hourly wage. Then we can conclude that although the English language proficiency of immigrants does not directly affect their labor force participation, it does have an indirect effect on their labor force participation—through its effect on their hourly wages.

The paper begins with a descriptive analysis of the hourly wages of immigrant workers. We have presented the mean hourly wages of immigrant workers by their demographic characteristics including gender, age, and marital status, country of birth, English language proficiency and by the characteristics of their college education including the type or level, major field of study, and region of the world where they earned their most recent college degree. The mean hourly earnings data are presented for all employed immigrants and separately for male and female employed immigrants.[i]

In the second part of this paper we present findings from our multivariate regression analysis of hourly earnings of employed immigrant workers. The multivariate regression analysis consists of estimating human capital earnings functions with explanatory variables that include measures of the level, quality, and transferability of the human capital of employed college-educated immigrants and a set of demographic controls. Findings from these earnings regressions provide valuable insights into the human capital determinants of the level of hourly earnings of immigrant workers, including the effect of different measures of human capital including the most basic measure of the level of their education and work experience, and other measures of human capital that pertain to immigrants such as English language proficiency and the degree of transferability of their educational human capital measured by the country or region of the world where they acquired their most recent college degree. Estimates of the parameters from these human capital hourly earnings functions will be utilized to impute an hourly wage for each foreign born college graduate in the National Survey of College Graduates (NSCG) data base. This imputed wage will be used in the analysis of determinants of labor force participation among college-educated immigrants.

Data Source and Definitions

This paper relies on data from the 2003 National Survey of College Graduates (NSCG). The 2003 NSCG survey gathers detailed information employment and education status of respondents, and their demographic characteristics. The database contains responses of a sample of 100,400 US residents who had a bachelor's or a higher degree at the time of the 2000 decennial census. The age of the NSCG sample respondents was between 23 and 76 years old in 2003. The 2000 NSCG sample was drawn from the 2000 decennial census long-form survey. The NSCG database contains nearly 450 variables providing very detailed information on the educational attainment and school enrollment status, labor market status and job characteristics of those who were employed, and the demographic traits of college graduates including their nativity status and the country in which foreign-born college graduates had they earned their most recent college degree. The contents and sample size of the 2003 NSCG provides a very rich and appropriate database that is perfectly suited to our study.

We have identified immigrants as those respondents who were born abroad. Based on their answers to questions regarding citizenship the NSCG classifies all respondents into four categories: native-born US citizen, naturalized US citizen, not a US citizen—permanent US resident, and not a citizen—temporary US resident. The foreign born or immigrant population consists of naturalized US citizens and both categories of non US citizens—those who were permanent US residents, as well as those who were temporary US residents.

The NSCG data do not directly report the hourly wage of respondents who were employed at the time of the survey during the week of October 1, 2003. We have computed the hourly wage from annual salary and annual hours of work. Therefore the hourly wage is computed for all employed respondents regardless of whether they were paid hourly wages, weekly, semi-monthly etc. The NSCG data gathers information on the annual salary from respondents who were employed during the week of the survey. Respondents who were employed were also asked about the weekly hours that they typically worked at the job and the number of annual weeks of work upon which the annual salary was based.[ii]. Using the product of the annual weeks of work and weekly hours of work that respondents have reported, we have estimated the annual hours of work upon which their reported annual salary was based. The hourly wage was then computed by dividing the annual salary by the annual hours of work.

The analysis in this paper is based upon immigrants who were employed during the week of October 1, 2003 and who had earned a positive annual salary. Because of the lower labor force attachment of the elderly population and the differences in their labor force behavior compared to the non-elderly population we have excluded the elderly (65 years and older) population from the analysis presented in this paper. Furthermore, since respondents reported the usual weekly hours and annual weeks upon which the salary was based retrospectively, there were cases where the salary and hours may have been either over or underreported resulting in extremely high or low hourly wages. Such outliers were excluded from the analysis presented in this paper by excluding individuals who had hourly wages approximately above the highest percentile and below the lowest percentile of the hourly wage distribution.

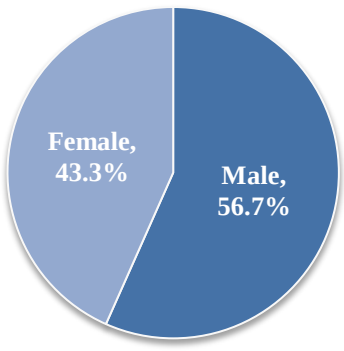
Mean Hourly Earnings

Gender

Analyses of the NSCG data reveal that a total of 3.72 million college-educated immigrants were employed at the time of the 2003 NSCG survey. The mean hourly salary of these immigrants was $31.72. Nearly 57 percent of employed immigrants consisted of males. A comparison of the mean wage of male and female immigrants shows a sizeable gap. The mean hourly wage of employed male immigrants was $34.34; an hourly wage level that was $6 or 21 percent higher than the $28.29 mean hourly wage of employed immigrant women. Males comprised a majority of employed immigrant college-graduates; 56.7 percent.

Table 1: Mean Hourly Wages of 22-64 Year Old Employed College-Educated Immigrants by Gender, and the Distribution of Employed Immigrants by Gender, 2003

Gender	Mean Hourly Wage
Total	$31.72
Male	34.34
Female	28.29
Difference (male-female)	
Absolute	$6.05
Relative	21.4%



Many reasons including but not limited to the lower levels of college education among women, different major fields of study of the college degrees of female immigrants, access to different sets of occupations, and the lower likelihood of full-time jobs among female immigrants (that pay more per hour), underlie the male-female hourly wage gap among immigrants; even those with a college education. Exploring the underlying causes of this male-female wage gap is beyond the scope of this paper. However, because of the differences in the wages of male and female immigrants and the overall differences in the degree of labor market attachment of men and women, and the differences in many of the determinants of the labor market behaviors of men and women, we have frequently presented gender difference in the hourly wages and have estimated the multivariate earnings regressions (human capital earnings functions) for all college-educated and separately for male and female college-educated immigrants.

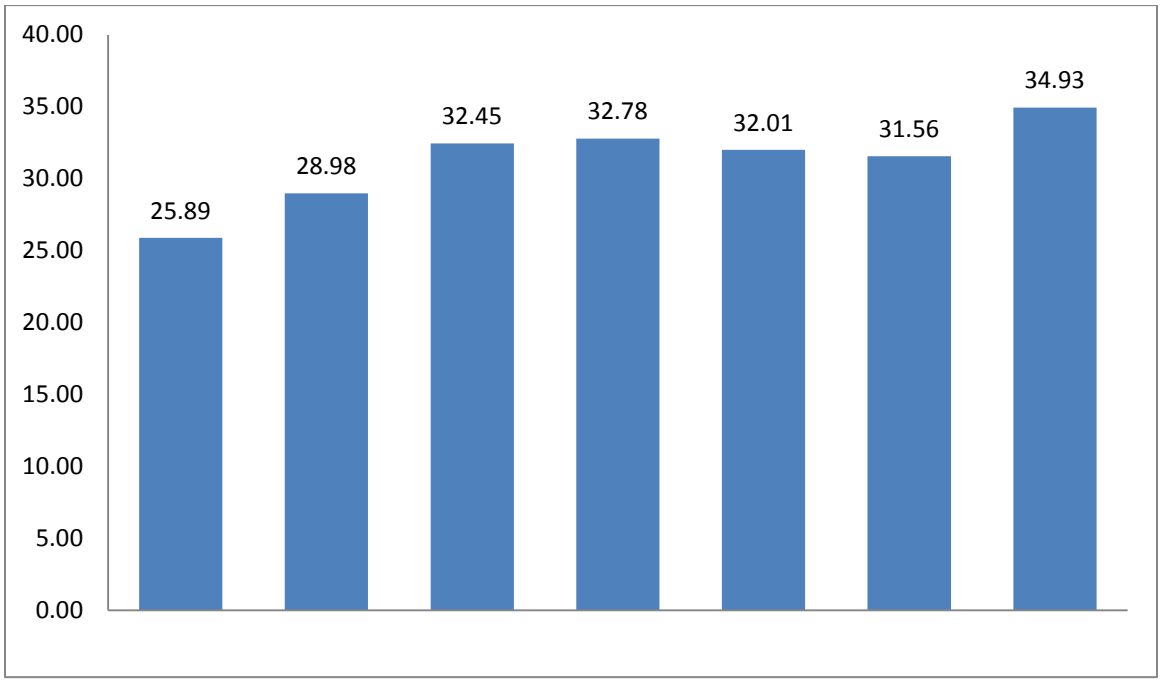
Age

An examination of the mean hourly wage of workers by age groups found that younger workers earned lower wages per hour and the hourly wage increased by age, but the rate of increase in the hourly wage was slower after age 35-39. The youngest college-graduate immigrants (23-29 years old) who were employed at the time of the NSCG survey earned $25.89 per hour in 2003. As workers age they gain more labor market work experience. Work experience is considered to be a form of human capital. According to the human capital theory, education affects earnings positively because workers with a higher stock of human capital (education and/or work experience) are more knowledgeable and therefore more productive in the labor market. The theory posits that earnings are determined by the quantity of human capital accumulated and by the rate of return to various forms of human capital (Becker, 1964).

The acquisition of human capital does not stop when schooling ends. Post school acquisition of human capital occurs in the form of work experience. Therefore earnings are expected to increase with age as workers acquire more work experience. However, the growth of post-school human capital from work experience is not linear (does not grow proportionately with each additional year of work experience). According to the human capital theory, the growth in human capital with additional work experience occurs at a decreasing rate. Therefore after a certain level of work experience is reached (at a certain age) the wage increase from

additional work experience is expected to occur at a decreasing rate (slower pace). The hourly wages of immigrants follow this pattern that is predicted by the human capital theory; rising rapidly with age until age 35-39 after which the hourly wage increases only very gradually. The somewhat anomalous increase in the hourly wage among 55-64 year old immigrants might be due to some high wage earners in this age group that raise the hourly wage for this group of workers. This is likely to occur in an analysis of earnings by age (or what is known as the age-earning profiles) that is based on cross-sectional data since the age-earnings profile shape (upward slope, age of peak earnings, and downward slope) is different across individual workers.

Chart 1: Mean Hourly Wages of 23-64 Year Old Employed College-Educated Immigrants by Age, 2003



Marital Status

The hourly wage of immigrants varied widely by their marital status and almost all the variation was due to the higher wages of married men compared to their not married counterparts. Studies that have examined wages of married men and unmarried men have consistently found that married men earn more than their unmarried counterparts. Even after statistically controlling for other factors that are likely to affect earnings, researchers have found male marriage wage premiums ranging from 10 percent to 50 percent. (Lincoln, 2008; Antonovics and Town, 2003). Three most common reasons are cited for this marriage premium

among men. First, married men are responsible for fewer household-related tasks allowing them to focus on their careers making them more productive in their jobs. This specialization hypothesis espoused by Gary Becker (1985) might be even more relevant in the case of immigrant families since many come from cultures where it is more likely that the wife specializes in household production leaving more time and resources for the husband to focus on his job. The second reason cited for the marriage wage premium among men is that employers prefer to hire married men and discriminate in favor of married men by paying them higher wages. The third reason is that the qualities that make married men successful in the labor market are the same qualities that make them more marriageable. Research on this subject is ongoing with no conclusive answer to the reason underlying the male marriage wage premium.

Table 2: Mean Hourly Wages of 22-64 Year Old Employed College-Educated Immigrants, by Marital Status at the time of the 2003 NSCG Survey, by Gender, 2003

	All	Men	Women
Married	$32.38	$35.14	$28.44
Not Married*	$28.92	$30.17	$27.78
(Married minus not married)			
Absolute Difference	$3.46	$4.97	$0.66
Relative Difference	12.0%	16.5%	2.4%
Percent Married	80.8%	83.8%	76.8%

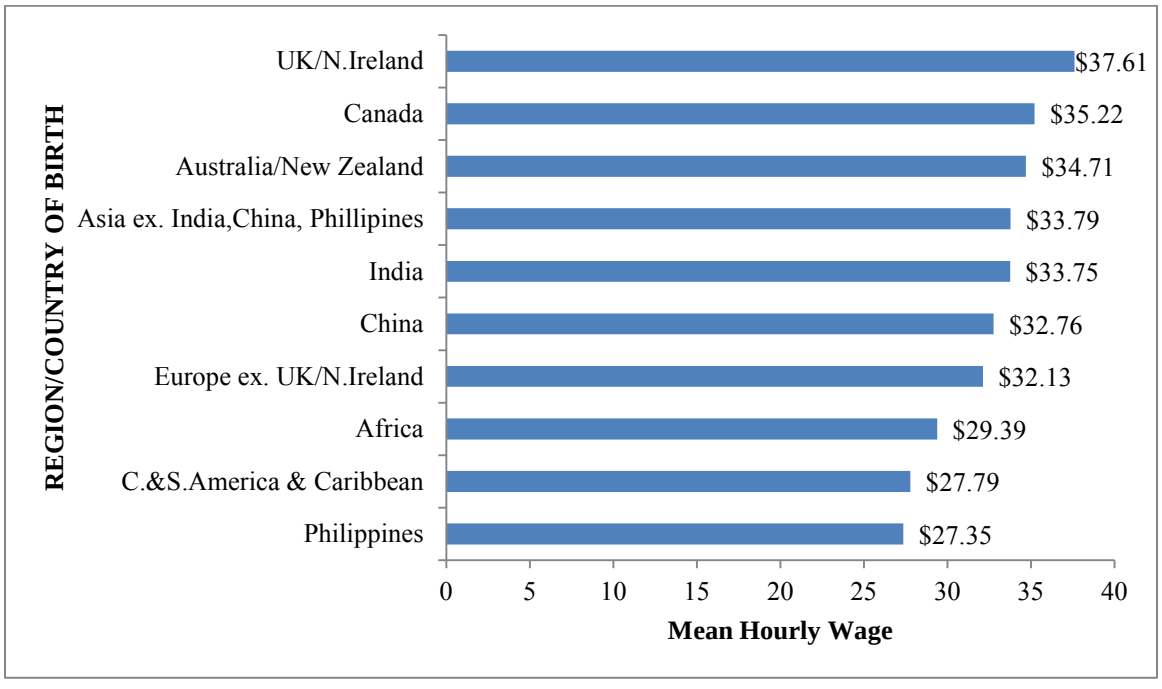
*Not married includes those who were single as well as those who were widowed, divorced, or separated at the time of the NSCG survey.

Our analysis of the hourly wages of immigrants reveals a sizable marriage premium. Married immigrants who were employed at the time of the 2003 NSCG earned $32.38 per hour whereas their not married counterparts earned $28.92 per hour; representing a gap of $3.46 or a marriage premium of 12 percent. This marriage wage premium is largely attributable to the marriage wage gap among immigrant men. Married male immigrants earned nearly $5 more per hour than their counterparts who were not married at the time of the NSCG survey; representing a male marriage wage premium of 16.5%. Female immigrants saw a very small marriage wage premium of $0.66 per hour or just 2 percent.

Country / Region of Birth

The hourly wage of college-educated immigrants varied widely by their native country. The NSCG database reports 168 countries of birth of immigrant respondents. We have grouped these countries into ten regions/countries around the world.[1] Some countries of birth of immigrant respondents to the NSCG had sample sizes that were large enough to produce reliable statistics and were therefore identified separately. Immigrants from the remaining countries with smaller sample sizes of college-educated employed immigrants were aggregated by regional groups of countries. These ten regions/countries are listed in Chart 2 along with the 2003 mean hourly wages of employed immigrants in the US who were born in these regions/countries. Findings in Chart 2 show that immigrants born in the UK earned the highest hourly wage compared to their counterparts from the remaining nine regions/countries; $37.61 per hour; followed by immigrants born in Canada and Australia/New Zealand with the second and third highest hourly wages--$35.22 and $34.71, respectively.

Chart 2: Mean Hourly Wages of 22-64 Year Old Employed College-Educated Immigrants, by Region/Country of Birth, 2003



[1] See Appendix A for the countries included in the regions presented in this paper.

The hourly wages of immigrants born in India, China and the rest of Asia (excluding Philippines) were approximately in the middle of the distribution of the hourly wages of immigrants born in each of the 10 regions across the world. College-educated immigrants from India who were employed in 2003 earned $33.75 per hour while their counterparts from China earned a dollar less per hour ($32.76) and those from the remainder of Asia (excluding Philippines) earned a dollar more per hour ($33.79).

Employed immigrants from Europe excluding the UK, earned $32.13 per hour and African-born employed immigrant college graduates earned nearly $3 less per hour; $29.39. College-educated immigrants from Central and South America and the Caribbean who were working in October of 2003 earned $27.79 per hour placing them at rank number 9 out of 10 regions/countries. Immigrants born in the Philippines earned $27.35; the lowest compared to the ten regions/countries presented in Chart 2 and $10.26 per hour or 27% lower than the mean hourly earnings of immigrants from the UK

There was sizable variation in the hourly earnings of employed immigrants by their place of birth. Even though they all had a college degree there are likely many other differences [ranging from demographic characteristics (age, gender, and the like) to the level of college education, major field of study, quality of college degree, English language proficiency, etc.] between these groups of immigrants to which their hourly wage differences could be attributed. We have examined two additional variables that are associated with the hourly wage differences between immigrants from different countries, and that are important from a policy perspective to our overall study of the labor market underutilization among college-educated immigrants. One is the country in which the college-educated immigrant earned their college degree and the second is the class of admission or type of visa under which the immigrant first entered the United States for 6 months or more.

Country or Region of the College Degree

Immigrants who earn their college degree in the United States are expected to have better labor market outcomes than their counterparts whose college degree was earned abroad. The country in which an immigrant has earned a college degree determines the degree of transferability of the education and skills that an individual acquired prior to immigration to the United States. The most commonly applied theoretical model to the labor market pathways of

immigrants is the immigrant assimilation model (Akresh, 2008). This model suggests that because of the imperfect portability of human capital acquired in different countries, upon arrival to the US (or any destination country) immigrants typically experience downward labor market mobility, in terms of their earnings, employment and occupational status. However, after spending some time in the United States the socioeconomic position of immigrants tend to improve as they accumulate the U.S.-specific experiences and skills (such as language fluency, social and job contacts, and familiarity with business cultures and practices) that are necessary for subsequent upward mobility in the labor market (Akresh, 2008; Batalova, Fix, and Creticos, 2008; Chiswick, 1978). Thus, this theoretical model suggests a U-shaped trajectory of labor market adjustment for immigrants.

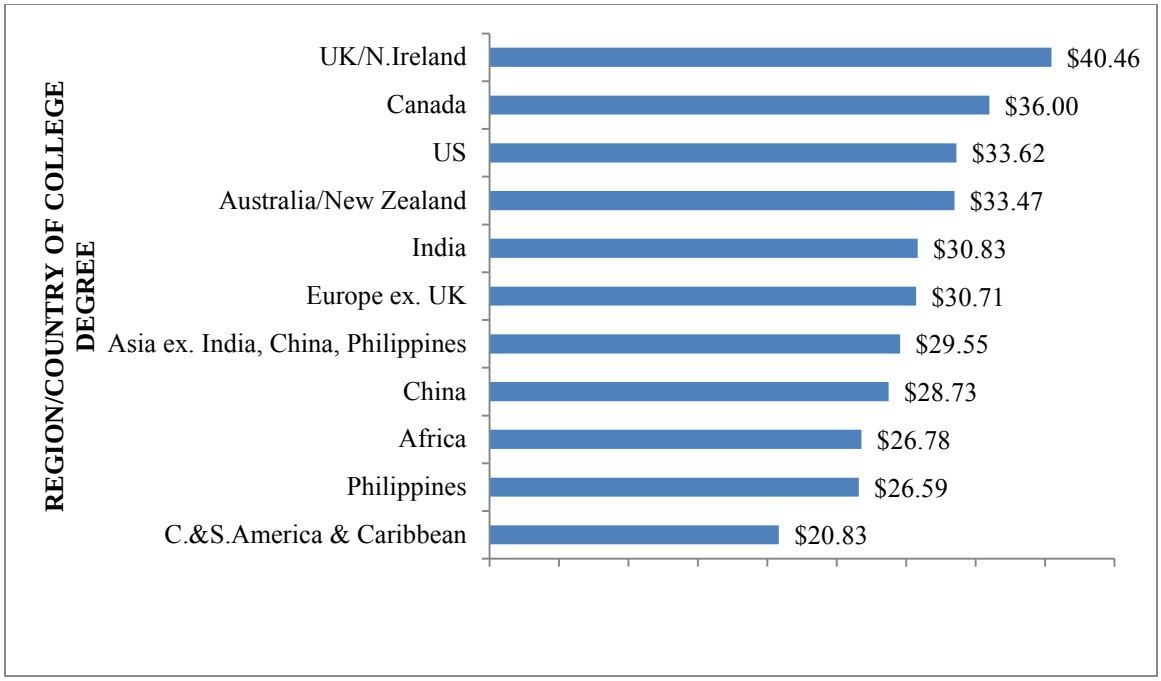
However, the depth of the U's trough depends on the degree of transferability of the skills, education and experience an individual acquired prior to immigration (Chiswick, Lee, and Miller 2005; Duleep and Regets, 1999). Chiswick and Miller, (2009) have stated that some immigrants' human capital has greater international transferability than others. For example, individuals from countries that are linguistically, socially and economically more similar to the United States are likely to assimilate quicker into the U.S. labor force and to experience less labor market downgrading than their peers with more dissimilar origins. Among immigrants who don't have US schooling, labor market returns are expected to be higher for immigrants with schooling from highly developed countries and where English is an official language (Bratsberg and Ragan, 2002).

In this paper we have examined the transferability of the educational human capital of college-educated immigrants by examining the association between their hourly wages and the country in which they earned their most recent college degree. Human capital acquired in the form of post-school work experience might also not be perfectly transferable from the source to the destination country of immigrants. However, we are unable to examine the degree of transferability of work experience acquired abroad as the NSCG does not gather data on the actual work experience of respondents in the US or abroad

An examination of the mean hourly wages of immigrants by the region/country from where they earned their college degree reveals sizable differences. With the exception of immigrants with college degrees from Canada and the UK, the mean hourly wage of immigrants

with college degrees from abroad were lower compared to their counterparts with degrees from the United States. The mean hourly wage of immigrants whose most recent degree was earned in the UK was $40.46, while those who earned their college degree in Canada earned $36 per hour. Immigrants with British and Canadian college degrees respectively earned $7 and $3.60 more than their counterparts with US college degrees.

Chart 3: Mean Hourly Wages of 22-64 Year Old Employed College-Educated Immigrants, by the Region/Country Where They Earned Their Most Recent College Degree, 2003



One-quarter of employed non-elderly immigrants with Canadian and British college degrees had entered the US with a work visa. Immigrants with a work visa have a job waiting for them when they land here and are therefore more likely to have skills and education that are easily transferable in the US labor market. Therefore they are much less likely to experience downward mobility in the labor market upon entry and therefore less likely to earn lower wages that their US-degreed immigrant counterparts. Their higher wages of immigrants with British and Canadian degreed compared to US-degreed immigrants could be due to many other factors. Our regression analysis of hourly wages presented in the next section of this paper statistically disentangles the effects of country/region of college degree from that of other variables on the hourly wages of immigrants and sheds light on the independent effect on hourly wages of the country or region of the college degree of immigrant college graduates.

Immigrants with Australian degrees earned just slightly less than US-degreed immigrants while immigrants with Indian degrees earned about $3 less per hour compared to the hourly wages of immigrants with a US degree ($30.83 versus $33.62). Immigrants with European (excluding UK) degrees earned slightly less than those with degrees from India ($30.71).. Immigrants who had earned their college degrees from remaining five regions/countries earned hourly wages under $30, ranging from $29.55 among immigrants with Asian college degrees (excluding China, India, and Philippines) to just $20.83 per hour among those with Central and South American and Caribbean college degrees.

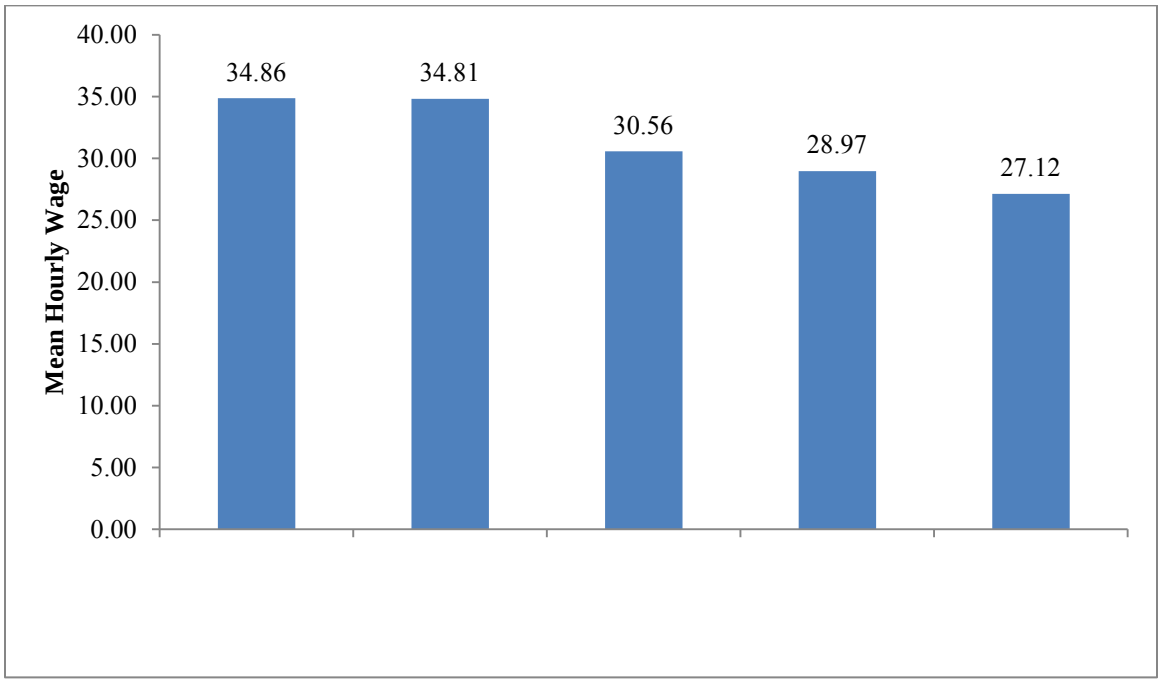
Type of Visa

Type of visa or class of admission is postulated to be related to labor market outcomes as it provides information about some unobservable characteristics of the immigrant like the characteristics under which the immigrant migrated (Akresh 2008). An immigrant who enters the US with a work visa is more likely to make a lateral instead of a downward transition into the US labor market. Migrants who enter the US with a student visa are more likely to have a degree earned in the US and are therefore also more likely to have a lateral transition to the US labor market. In contrast, individuals who enter as permanent residents or as dependents of US residents (family migrants) do not make their migration decision based on their earning potential. Rather their migration decision is influenced by the prior immigration of their sponsoring relative. Therefore they may have less transferable labor market skills.

Every legal immigrant enters the United States with a visa. The NSCG questionnaire asks foreign-born respondents to identify the type of visa that they held when they first visited the United States for 6 months or longer. Respondents were asked to select from one of the following: permanent U.S. resident visa (Green Card), temporary US resident visa for work (e.g., H-1B, L-1A, L-1B, etc.), temporary US resident visa for study or training (e.g., F-1, J-1, H-3, etc.), temporary US resident visa as dependent of another person (e.g., F-2, H-4, J-2, K-2, etc.), or a temporary US resident visa for any other reason. The last category could include any other temporary US resident visas including asylee, religious worker, etc.

An examination of the hourly wages of immigrants by class of admission or entry visa type reveals the highest hourly wages among those college-educated immigrants who entered the

Chart 4: Mean Hourly Wages of 22-64 Year Old Employed College-Educated Immigrants, by the Type of Visa at the Time of Their First Entry to the US for Six Months or Longer, 2003



US with a work visa and those who entered with a student visa. The mean hourly wage of both groups was about $34.80 per hour in 2003. Those immigrants, who entered the US as a permanent resident (finished the necessary paperwork for permanent US residency in their native country and securing their green card immediately upon entry to the US) earned an hourly wage of $30.56 per hour in 2003. College-educated immigrants who entered the US with a dependent visa (family class of admission) earned $28.97 in 2003 and their counterparts with other types of visa (asylee, religious worker, etc.) had the lowest hourly wage in 2003; $27.12.

English Language Proficiency

English language proficiency is another important human capital trait in the US labor market. Chiswick and Miller (1992) consider English language proficiency of immigrants in the US to be very important and consider it the most basic form of human capital in the US labor market. While all aspects of English language proficiency—reading, writing, speaking and understanding English are important to the labor market success of immigrants, Carnevale, Fry, and Lowell (2001) found that understanding English is the most important English ability in the US labor market and that the positive labor market impact of English reading, writing and speaking ability among immigrants was contingent upon their ability to understand spoken

English. Their study examined the connection between English language proficiency and earnings of all immigrants and not just college-educated immigrants. Among college-educated immigrants the ability to speak, read and write as well understand English, are all expected to be closely connected with their labor market success.

Most studies on the effect of English language ability of immigrants on their labor market success use the self-reported English speaking ability of respondents to the decennial census long-form survey. Our measure of the English language proficiency of NSCG respondents is also based on the self-reported English speaking ability of immigrant college graduates from the 2000 decennial census data. The NSCG survey does not provide data on the English language proficiency of respondents. However, since the NSCG sample is drawn from college graduates in the 2000 decennial census, we have measured the average English language proficiency of non-elderly college-educated immigrants from 168 different countries from the decennial census and used this measure to represent the English speaking ability of non-elderly college-educated immigrants from each of the same 168 countries in the NSCG. The mean English language proficiency of the immigrant group of non-elderly and employed college graduates included in this paper, ranged between 3.06 to 4.96 on the following 1-5 scale of self-reported English speaking proficiency: 1=bilingual, does not speak English, 2=bilingual, speaks English but not well, 3=bilingual, speaks English well, 4=bilingual, speaks English very well, 5=monolingual, speaks only English."

An examination of the mean hourly earnings of immigrant college-graduates by their English speaking ability reveals higher wages among immigrants with a better English speaking ability. Among the four groups of immigrants representing four levels of English speaking ability (presented in Table 3), those at the bottom (with the lowest English speaking ability) had mean hourly wages of $29.24 while those at the top earned $34.01 per hour, representing an hourly wage premium of $4.77 or 16 percent from about a 1.5 point increase on the scale of English speaking ability. For each half point increase on the scale of English speaking ability, the hourly wage of immigrant college graduates increased, albeit at a decreasing rate.

The association between English speaking ability and earnings is more consistent among college-educated immigrant men than among women. Although both male and female

Table 3: Mean Hourly Wages of 22-64 Year Old Employed College-Educated Immigrants, by Self-Reported English Speaking Ability, 2003

Scale of self-reported English speaking ability*	All	Male	Female
3.06<3.5	$29.24	$31.46	$26.62
3.5<4	31.99	34.19	29.09
4.0<4.5	33.12	36.05	28.42
4.5-4.96	34.01	38.38	28.25
Total	31.72	34.34	28.29

Scale: 3=bilingual, speaks English well, 4=bilingual, speaks English very well, 5=monolingual, speaks only English

immigrants with English speaking ability in the 3.5<4 range, respectively earn $2.74 and 2.47 more per hour more than their counterparts with <3.5 English speaking ability, the mean hourly wages of male immigrants continue to increase with higher levels of English speaking proficiency whereas the hourly wages of female immigrants do not rise with additional increments in their English speaking ability after reaching 4.0 on the scale. Differences in the relationship between English speaking ability and hourly earnings of male and female college-educated immigrants, warrants further research to examine the potential sources of these differences.

Level of Education

The final two human capital characteristics of immigrants examined in this section of the paper represent the traditional educational human capital measured by the degree level of the most recent degree earned by immigrant college graduates and the major field of study of that college degree. The mean hourly earnings of immigrant college graduates increased consistently with education among all immigrants as well as male and female immigrants. Relative to a bachelor's degree, the 2003 hourly wage premium of a master's degree among employed immigrants was 14 percent among men, nearly 17 percent among women and 16 percent among all (men and women combined).

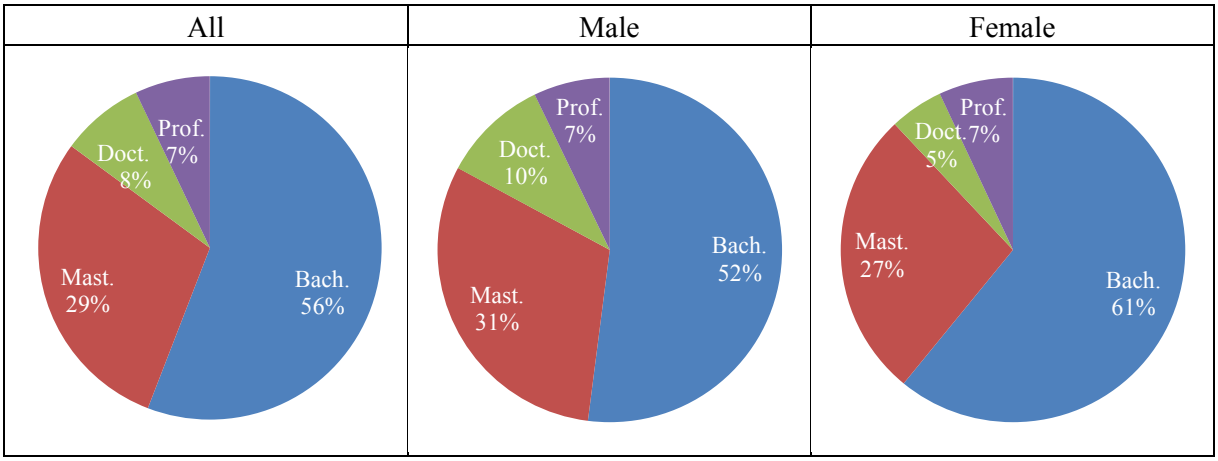
The hourly earnings premium of a doctorate degree relative to a bachelor's degree was 32 percent among all immigrants, 27 percent among males, and 29 percent among females. The higher doctorate wage premium among all immigrants relative to male and female doctorate

degree holders stems from the educational level differences between male and female immigrants. Findings presented in Chart 5 reveal that 61 percent of female immigrants possessed a bachelor's degree compared to only 52 percent among male immigrants. The lower wages of female immigrants combined with higher shares of female immigrants with a bachelor's degree means puts a downward pressure on the mean wage of all immigrants with a bachelor's degree. Similarly since male immigrants were twice as likely to have a doctorate degree, the higher male immigrant wages put an upward pressure on the mean wages of all immigrants with a doctorate degree. Therefore the wage premium of a doctorate degree among all immigrants is higher than the premium for the same degree level among male and female immigrants.

Table 4: Mean Hourly Wages of 22-64 Year Old Employed College-Educated Immigrants, by Educational Attainment, 2003

	All		Male		Female	
Education	Mean Hourly Wage	Relative to Bachelor's Degree Hourly Wage	Mean Hourly Wage	Relative to Bachelor's Degree Hourly Wage	Mean Hourly Wage	Relative to Bachelor's Degree Hourly Wage
Bachelor's	28.24	100%	30.58	100%	25.62	100%
Master's	32.87	116%	34.84	114%	29.94	117%
Doctorate	37.15	132%	38.74	127%	33.02	129%
Professional	48.40	171%	53.35	174%	41.75	163%

Chart 5: Percentage Distribution of 22-64 Year Old Employed College-Educated Immigrants, by Educational Attainment, 2003

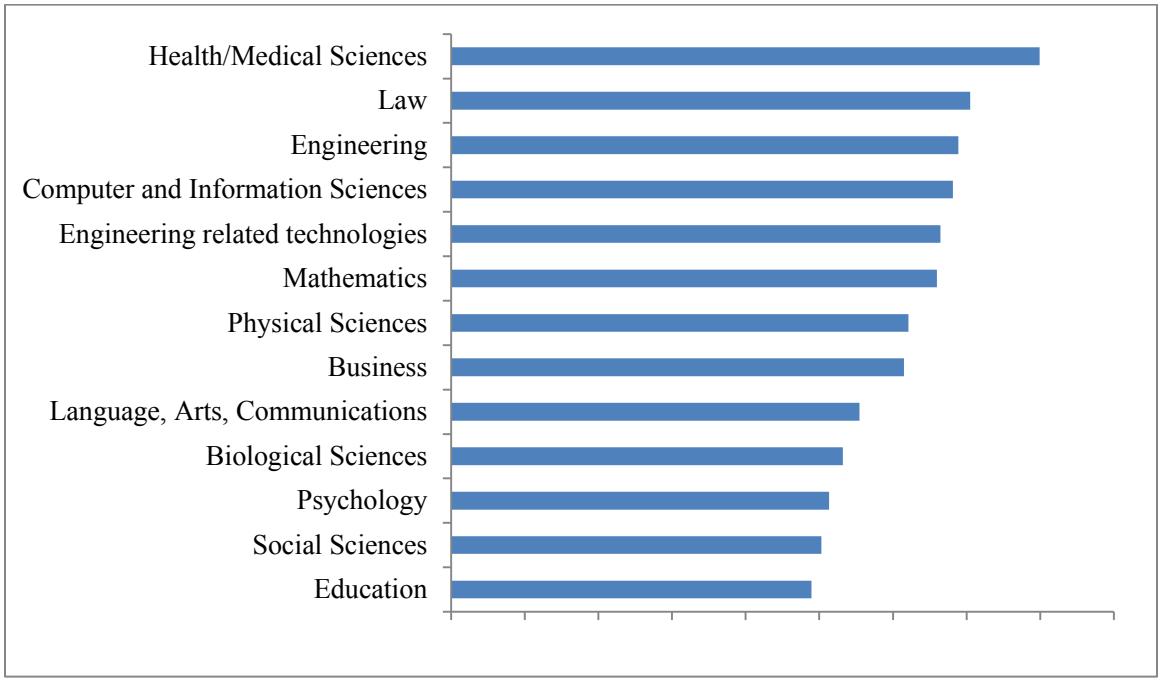


The hourly wage premium of a professional college degree such as a JD or MD compared to a bachelor's degree was 71 percent higher among all immigrants. The professional degree wage premium was much higher among male immigrants (74 percent) than among female immigrants (63 percent). The share of employed immigrant college graduates with a professional degree was the same among males and females—7 percent.

Major Field of Study

The hourly wages of employed immigrant college graduates also varied by the major field of study of their most recent college degree. In 2003, immigrant college graduates with the highest hourly wages had majored in health and medical science majors ($40 per hour) and law ($35). These two major fields are associated with two most common professional degrees—MD and JD. The mean hourly wages of engineering and computer science majors was $34 per hour; math majors earned $33 per hour; and physical sciences and business majors earned $31 per hour. Education majors had the lowest hourly wages, $24.50. Also at the lower end ($25-$28 per hour) were those who had majored in social sciences, psychology, biological sciences, and language/arts/communication.

Chart 6: Mean Hourly Wage of 22-64 Year Old Employed College-Educated Immigrants, by Major Field of Study, 2003



Multivariate Regression Analysis

The descriptive analysis presented above reveals that a number of variables measuring demographic traits, different types of human capital, and the quality of the human capital, affect the hourly wages of immigrant college graduates who were employed at the time of the 2003 NSCG survey. In this section we shall estimate the independent impact of each one of these variables using multivariate regression analysis that will allow the measurement of the effect of each explanatory variable on the hourly wage, after statistically controlling for other variables known to influence hourly earnings that are included as explanatory variables in the regression models.

Utilizing multivariate regression analysis, we have estimated the impact on hourly wages of traditional human capital measures—educational attainment, work experience, and major field of study (a measure of the type of human capital); and human capital and other measures that are pertinent to immigrants—country of the most recent college degree, English language proficiency, and the class of admission (type of visa) of their first entry to the US. We have also included as explanatory variables two demographic controls known to influence hourly earnings—marital status and gender. One of the variables known to influence earnings is the strength of the local labor market. The NSCG provides data on the region in the US in which the respondent resided at the time of the survey. We have used the four US (census) regions as explanatory variables in the earnings regressions to statistically control for and measure the effect of the regional US labor markets on the hourly earnings of immigrant college graduates.

The hourly wage regressions were estimated for all immigrant college graduates and separately for male and female college-educated immigrants. The regression models are restricted to immigrant college graduates between the ages of 23 and 64 who were and employed with a positive salary at the time of the 2003 NSCG survey. Findings from the hourly earnings regression model are presented in three separate tables each containing three sets of explanatory variables: traditional human capital measures, human capital measures pertaining to immigrants, and demographic and regional measures. Each of the variables in these three sets of variables were included together in the regression models. We have presented each set of findings separately along with the discussion of the findings from that set of variables. All findings from the regression analysis including definitions of the dependent variable and all the explanatory

variables as well as the estimated coefficients, standard errors, and t-statistics are presented in an appendix to this paper.

Level of Education, Work Experience, Major Field of Study

Findings in Table 5 contain estimates of the impact of educational attainment and work experience on the hourly earnings of college-educated immigrants after statistically controlling for other variables known to influence hourly earnings and included in the regression. According to the human capital theory, education should affect earnings positively because workers with more schooling are more knowledgeable and therefore more productive. The productivity-enhancing effect of schooling leads to higher earnings among better-educated workers. Work experience is also considered as a form of human capital that is acquired in the labor market. However, the return to additional work experience is expected to increase at a decreasing rate. Therefore we have specified work experience in our earnings regression models in linear and quadratic terms (Mincer 1974). If the estimated coefficient for work experience is positive for the linear and negative for the quadratic variable, then the findings would confirm that the hourly wage increment to additional work experience do indeed increase at a decreasing rate.

The regression-adjusted effect of additional education on the hourly earnings of immigrants is sizable, albeit smaller than the unadjusted effects presented in the descriptive analysis above. Even after controlling for all the other variables included in this regression, immigrants with a master's degree, a doctorate degree, or a professional degree are expected to respectively earn 12 percent, 27 percent, and 53 percent more per hour than their counterparts with a just a bachelor's degree. The educational wage premiums are somewhat different among male and female immigrants, although still quite sizable among both sexes. Relative to a bachelor's degree, the wage premium for a master's and a professional degree is expected to be higher among immigrant women than among immigrant men whereas the wage premium for a doctorate degree is expected to be about the same for both sexes.

Since the NSCG data does not provide a direct measure of the actual work experience of respondents, we have used a proxy measure of work experience based on age and educational attainment. This proxy measure of work experience is frequently used by researchers when the actual work experience measure is not available. As expected, additional work experience is expected to increase the hourly wage of immigrants (all, males and females). The findings

(negative and statistically significant coefficient of the quadratic work experience term) also confirm that from each additional year of work experience the hourly wage is expected to increase at a decreasing rate. Each additional year of work experience is expected to increase the hourly earnings by 2.2 percent among all immigrants, 2 percent among males and 2.4 percent among female immigrants.

The major field of study of the most recent college degree of the immigrant is closely associated with their hourly wages. We have grouped the individual major fields of immigrant workers into 13 broad groups. After controlling for all the other variables included in the regression, immigrants with degrees in computer and information science and health and medical sciences are expected to earn nearly one-third higher hourly wages relative to the hourly earnings of their counterparts from arts, language, and communication majors. The hourly wage premium among college-educated immigrants is also high in the fields of engineering, engineering technology, mathematics, and business. Compared to the hourly wage of immigrants in the reference group (arts, language and communication majors), the hourly wages is expected to be 28 percent higher in engineering fields, 18 percent higher in engineering technology, 17 percent higher in mathematics , and 12 percent higher in business fields of study. Social science majors are expected to earn less than arts, language and humanities majors.

The regression finds a 9 percent higher hourly wage among physical sciences majors and a 5 percent lower hourly wage expected among biological science majors. The coefficients of the remaining three majors (law, education, and psychology) were not statistically different from zero which means after controlling for all the other explanatory variables included in the regression, the hourly earnings of immigrants with degrees in these three majors are not expected to be different from arts, language and communications majors.

A comparison of the regression models estimated separately for men and women reveals the following differences. The two highest hourly wage premium majors among men were health and medical sciences (43 percent premium) and computer and information science (37 percent premium) whereas among immigrant women it was the engineering technology major (43 percent premium) and engineering major (27 percent premium). Women who majored in health/ medical sciences and computer/information science are also expected to earn an hourly wage premium, albeit smaller than the premium of their male counterparts. Another notable difference

between female and male immigrants is in the field of mathematics. Whereas immigrant male math majors are expected to earn 24 percent higher hourly wages than male arts, language and communication majors; the hourly wage of female immigrant math majors is not statistically different from that of their counterparts with a college major in arts language and communications.

Table 5: Regression-Adjusted Percent Effect of Educational Attainment, Work Experience, and Major Field of Study on the Hourly Earnings of 22-64 Year Old Employed College-Educated Immigrants in the US, 2003

	All		Male		Female	
(Constant)	$13.83	***	$13.85	***	$15.59	***
Educational Attainment						
Master's	12%	***	10%	***	17%	***
Doctorate	27%	***	27%	***	26%	***
Professional	53%	***	47%	***	53%	***
Bachelor's	*Reference group*					
Work Experience						
Work Experience	2.2%	***	2.0%	***	2.4%	***
Work Experience squared	-0.04%	***	-0.03%	***	-0.05%	***
Zero work experience	*Reference group*					
Major Field of Study						
Computer and information science	32%	***	37%	***	25%	***
Mathematics	17%	***	24%	***	9%	*
Biological sciences	-5%	**	-7%	**	-2%	
Physical Sciences	9%	***	9%	**	7%	
Psychology	-3%		-7%		-2%	
Social Sciences	-9%	***	-10%	***	-8%	**
Engineering	28%	***	28%	***	31%	***
Health and medical sciences	32%	***	43%	***	26%	***
Education	-5%	*	-8%	*	-5%	
Engineering technology	18%	***	15%	***	43%	***
Business	12%	***	13%	***	10%	***
Law	-1%		13%	**	-13%	**
Arts, language and communication	*Reference group*					
Other explanatory variables in the regression model: region/country of most recent college degree, type of entry visa, English language skills, marital status, gender, and the region of residence in the US in 2003. (dependent variable: hourly wage)						

Statistical significance: *** .01 level, ** .05 level, * .10 level

The hourly wage premium for a law degree is not measured with a sufficient degree of precision among men and women and is significant at .05 level. However, the findings suggest that after controlling for other variables including degree level, a male immigrant with a degree in law is expected to earn an hourly wage 13 percent higher than the reference group (arts,

language and communication majors) whereas a female immigrant law major is expected to earn 12 percent less per hour compared to their counterparts in arts, language and communication majors. The small sample of law majors among immigrants might underlie some of these anomalous finding. The same small sample prevents any further analysis of the causes of these different findings among male and female immigrant law majors—which could be differences in the quality of the law degree, differences in the kinds of jobs of male and female law majors obtain, and the like. The field of law is likely to be less lucrative for those who are not willing to work in a very intensive manner. Any or all of these and other reasons might underlie the different regression findings of the wages of law majors among men and women.

Country/Region of College Degree, English Language Proficiency, Type of Visa

The next set of findings from our earnings regressions are presented in Table 6 and consist of variables that pertain to foreign-born individuals. The first set of variables pertains to the country in which the college-educated immigrant had earned their college degree. We have grouped 168 countries into regions across the world and have identified individual countries like Canada, China, India, and Philippines since the sample was large enough to identify these countries separately. Degrees from Australia/New Zealand comprised small shares of the sample that is analyzed in this paper (0.5 percent) but was included separately in this model since it is a separate region of the world.

The findings show that after controlling for other variables in the regression including degree level, work experience, type of visa, etc., immigrants with degrees from abroad do indeed earn lower hourly wages in the US labor markets. These findings could be evidence of the limited transferability to the US labor markets of the educational human capital earned in the different countries and regions of the world. The regression-adjusted hourly wages of immigrants with degrees earned in the UK and Australia were not statistically different from that of immigrants with US college degrees. Immigrants with Canadian college degrees are expected to earn about 7 percent lower wages than their counterparts with US college degrees. These findings are different from the simple descriptive comparison of the mean hourly wage of immigrants with Canadian and British degrees that found sizable premiums in hourly wages for these immigrants compared to immigrants with US degrees. The regression-adjusted findings suggest that the wage premiums of these immigrants are likely associated with other factors such

as their English speaking ability, level of education, amount of work experience, major field of study, entry visa type, and even gender composition and marital status. The regression-adjusted effect measures the independent effect of the country or region of college degrees after controlling for other variables that influence hourly wages.

Table 6: Regression-Adjusted Percent Effect of the Region/Country of the Most Recent College Degree, English Language Proficiency, and Type of Entry to US Visa, on the Hourly Earnings of 22-64 Year Old Employed College-Educated Immigrants in the US, 2003

	All		Male		Female	
Region/Country of Recent Degree						
Canada	-7%	**	-1%		-14%	***
UK/N. Ireland	4%		2%		6%	
Europe ex. UK	-18%	***	-15%	***	-23%	***
Australia/New Zealand	-10%	*	-8%		-16%	*
China	-20%	***	-24%	***	-15%	***
India	-18%	***	-13%	***	-25%	***
Philippines	-28%	***	-30%	***	-25%	***
Asia ex. China, India, Philippines	-24%	***	-26%	***	-21%	***
Africa	-27%	***	-30%	***	-17%	***
C.&S. America, Caribbean	-40%	***	-39%	***	-42%	***
U.S.	*Reference group*					
English Language Proficiency						
English speaking skill (scale 1-5)	4%	***	8%	***	0%	
Speaks English Well (3.0 on scale)	*Reference group*					
Type of Entry Visa						
Employment	21%	***	24%	***	13%	***
Student or training	2%		4%	**	-1%	
Dependent	-6%	***	-1%		-9%	***
Other	-4%	***	-7%	***	-1%	
Permanent U.S. resident	*Reference group*					

Other explanatory variables in the regression model: educational attainment, work experience, major field of college degree, marital status, gender, and the region of residence in the US in 2003. (dependent variable: hourly wage)

Statistical significance: *** .01 level, ** .05 level, * .10 level

Immigrants with a college degree from a Central or South American country or the Caribbean are expected to earn 40 percent lower wages than those with US college degrees. The hourly earnings deficit associated with college degrees from other regions/countries of the world range from -28 percent for Philippines, -27 percent for Africa, -24 percent in Asia excluding China India and Philippines, -20 percent in China, and -18 percent in India and in Europe

excluding UK. Male and female immigrants with degrees from abroad are expected to suffer a sizable wage deficit in the US labor markets compared to their counterparts with US degrees.

Immigrants with better English speaking skills are expected to earn a higher wage in the US labor markets. The regression findings presented in Table 6 suggest that even after controlling for other factors, the hourly wages of immigrants are expected to be 4 percent higher for an additional point in the English language scale compared to those at level 3 (the reference group). The estimated effect of English speaking ability on hourly earnings is different for male and female immigrants. Better English speaking skills are expected to have a strong positive effect on the hourly wages of men (8 percent higher for each point on the English language scale compared to the hourly wage of those at level 3 on the scale). In contrast, English speaking proficiency is estimated to have no impact on the hourly wages of female immigrants. It might have something to do with the type of work performed by female immigrants in the US labor markets where English speaking skills may not be as important to their productivity at work.

Immigrants who entered the United States with a work visa are expected to earn considerably higher wages than those who entered the US as permanent residents with a Green Card, in part because those with work visa are only permitted to immigrate with an established job offer from an American employer, while family-based and diversity visa green-card holders are not required to have job offers before immigrating. Compared to their counterparts who entered the US with a Green Card, the hourly wages for immigrants who entered with a work visa is expected to be 21 percent higher among all college-educated immigrants, 24 percent higher among males and 13 percent higher among females. The regression-adjusted wage premium among immigrants who entered with a student or training visa is estimated to be zero. Descriptive data revealed a high wage premium in this group. However, the wage premium of this group might be largely due to their US-based college degree or training and the effect of a US college degree on hourly wages is estimated separately (statistically controlled) in the regression model. Any other systematic difference in level of education, major field of study, English language proficiency, and the like are also isolated from the independent effect of student visa on the hourly wages of college-educated employed immigrants. This means that the entire wage premium of college-educated immigrants who entered the US with a student visa is attributable to other factors such as a US college degree and other variables that are included in the regression.

Among all immigrants, entry to the US as a dependent of a US resident is associated with 6 percent lower hourly wage relative to those who entered with a Green Card. Among female immigrants, those who entered the US with a dependent visa are expected to earn 9 percent lower hourly wages relative to their counterparts who entered with a Green Card. Female immigrants were twice as likely as males to enter the US as dependents (even among the select group of immigrants included in this analysis—non-elderly, employed, college-educated, and with a positive salary). The hourly wage of college-educated immigrants who entered with any other type of temporary US resident visa is expected to be 4 percent lower than that of their counterparts who entered the US with a Green Card.

Gender, Marital Status, Region of Residence in the US

The hourly wage regressions that we have estimated also contain demographic variables and the region in which the immigrant resided at the time of the 2003 NSCG survey. The latter is included to represent regional labor market differences that may influence hourly wages of workers. These third set of findings from our hourly wage regressions are presented in Table 8. The regression-adjusted male-female hourly wage gap is estimated to be 9 percent. Employed male immigrants with college-degrees are expected to earn 9 percent higher hourly wages than their female counterparts after statistically controlling for their educational human capital,

Table 8: Regression-Adjusted Percent Effect of Gender, Marital Status, and Region of Residence in the US in 2003, on the Hourly Earnings of 22-64 Year Old Employed College-Educated Immigrants in the US, 2003

	All		Male		Female	
Gender						
Male	9%	***				
Female	*Reference group*					
Marital Status in 2003						
Married	8%	***	14%	***	2%	
Not married	*Reference group*					
Region of Residence in 2003						
Northeast	9%	***	8%	***	10%	***
Midwest	1%		0%		2%	
West	11%	***	10%	***	12%	***
South	*Reference group*					
Other explanatory variables in the regression model: educational attainment, work experience (age), major field of college degree, region/country of most recent college degree, type of entry visa, and English language skills. (dependent variable: hourly wage)						

Statistical significance: *** .01 level, ** .05 level, * .10 level

immigrant-specific human capital traits, class of admission to the US, English language proficiency and marital status.

The regression-adjusted marriage premium for hourly wages is estimated to be 8 percent among all immigrants and 14 percent among male immigrants. Married male college-educated immigrants are expected to earn considerably higher hourly wages than men who are not married. Female immigrants with college degrees are not expected to reap an hourly wage marriage premium. These findings are very much in line with the findings of other research studies on this issue. As stated in a previous section of this paper, while there is little doubt about the existence of a marriage earnings premium among male workers, the research on the underlying reasons for the premium has not yet found a conclusive answer.

The final set of variables in the hourly wage regression models are proxy measures of the condition of the regional labor market in which the immigrant workers were employed. The regression-adjusted hourly wages of immigrants who lived in the Northeast and the West regions of the US were estimated to be higher than those who lived in the South at the time of the 2003 NSCG survey. No statistical difference was estimated in the regression-adjusted hourly wages of immigrant workers residing who lived in the in the Midwest region in 2003 compared to those who lived in the South.

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Appendix A: Countries in Each Region of the World

Region	Countries
Canada	
	Canada
UK/N. Ireland	
	United Kingdom, not specified
	England
	Scotland
	Wales
	Northern Ireland
Rest of Europe	
	Albania
	Austria
	Belgium
	Bulgaria
	Czechoslovakia
	Denmark
	Finland
	France
	Germany, not specified
	Greece
	Hungary
	Iceland
	Ireland
	Italy
	Luxembourg
	Malta
	Netherlands
	Norway
	Poland
	Portugal
	Azores Islands
	Romania
	Spain
	Sweden
	Switzerland
	Yugoslavia
	Europe, not specified
	Southern Europe, not specified
	Czech, Rep. of Slovakia
	Serbia-Montenegro

Rest of Europe (continued)	
	Slovenia
	Macedonia
	Bosnia-Hercegovina
	Croatia
	USSR
	Estonia
	Latvia
	Lithuania
	Moldova
	Belarus [Byelarus]
	Russia
	Kazakhstan
	Armenia
	Azerbaijan
	Georgia
	Uzbekistan
	Ukraine
	Turkemnistan
India	
	India
China	
	China
Philippines	
	Philippines
Rest of Asia	
	Afghanistan
	Bahrain
	Bangladesh
	Myanmar [formerly Burma]
	Cambodia
	Cyprus
	Hong Kong
	Indonesia
	Iran
	Iraq
	Israel
	Japan
	Jordan
	Korea, not specified
	South Korea

Rest of Asia (continued)	
	Kuwait
	Laos
	Lebanon
	Macao
	Malaysia
	Nepal
	Pakistan
	Saudi Arabia
	Singapore
	Sri Lanka
	Syria
	Taiwan
	Thailand
	Turkey
	Vietnam
	Yemen, Peoples Democratic Republic
	Yemen, Unified [1991 and after]
	Middle East, not specified
C. & S. America & Caribbean	
	Belize
	Costa Rica
	El Salvador
	Guatemala
	Honduras
	Mexico
	Nicaragua
	Panama
	Central America, not specified
	Antigua and Barbuda
	Aruba
	Bahamas
	Barbados
	Cuba
	Dominica
	Dominican Republic
	Grenada
	Haiti
	Jamaica
	Netherlands Antilles
	St. Kitts-Nevis

C. & S. America & Caribbean (continued)	
	St. Lucia
	St. Vincent and the Grenadin
	Trinidad and Tobago
	Caribbean, not specified
	West Indies, not specified
	Argentina
	Bolivia
	Brazil
	Chile
	Colombia
	Ecuador
	Guyana
	Paraguay
	Peru
	Surinam
	Uruguay
	Venezuela
	South America, not specified
Africa	
	Algeria
	Angola
	Cameroon
	Congo
	Egypt
	Ethiopia
	Ghana
	Ivory Coast
	Kenya
	Liberia
	Libya
	Madagascar
	Morocco
	Mozambique
	Nigeria
	Rwanda
	Senegal
	Sierra Leone
	South Africa
	Sudan
	Tanzania

Africa (continued)	
	Tunisia
	Uganda
	Zaire
	Zambia
	Zimbabwe
	Africa, not specified
	Central Africa, not specified
	Eastern Africa, not specified
	Western Africa, not specified
	Southern Africa, not specified
Australia/NZ	
	Australia
	Fiji
	New Zealand
	Tonga
	Western Samoa
	Oceania, not specified

Endnotes

[i] Since the hourly wage used in this paper is computed from the annual earnings and annual hours of work, we have used "hourly earnings" and "hourly wage" interchangeably in this paper.

[ii] The number of annual weeks of work include weeks of sick leave and paid vacation.