

# Revisiting the Earnings Profiles of Immigrants: New Trends and Evidence

Senior Thesis

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## Abstract

More than a million immigrants enter the United States every year, and immigrants form 13.9% of the country's labor force. Thus, understanding immigrant wages is very important to optimize policy-making. Many new theories and evidence have been presented, but many controversies still exist, in part due to the lack of data. Using the New Immigrant Survey, the first longitudinal survey focusing on new legal immigrants in the US, this paper studies the major determinants of immigrant wages today. On certain major issues, this paper finds limited evidence of cohort quality improvement and difference in transferability of skills by region. In addition, we verify the empirical validity of the family investment model, and in further exploring it, we find important benefits for both married men and women over single individuals, although men enjoy a larger advantage.

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# 1. Introduction

## 1.1 Immigration and the United States

The history of immigration is as long as the history of mankind itself. In search of better opportunities and survival, people have moved across continents, colonizing new lands, founding new homes and countries. Today, immigration remains an vital fact of societal change— more than 140 million people do not live in their country of birth— and although modern reasons for immigration vary and are diverse, economic factors are still key factors in decisions to migrate. From a macro-perspective, immigrant inflow increases a country's labor force and immigrants often bring new and valuable skills to the host country, increasing total productivity. While there are significant controversies over the frictional costs in the labor market due to immigration, for many of the world's developed

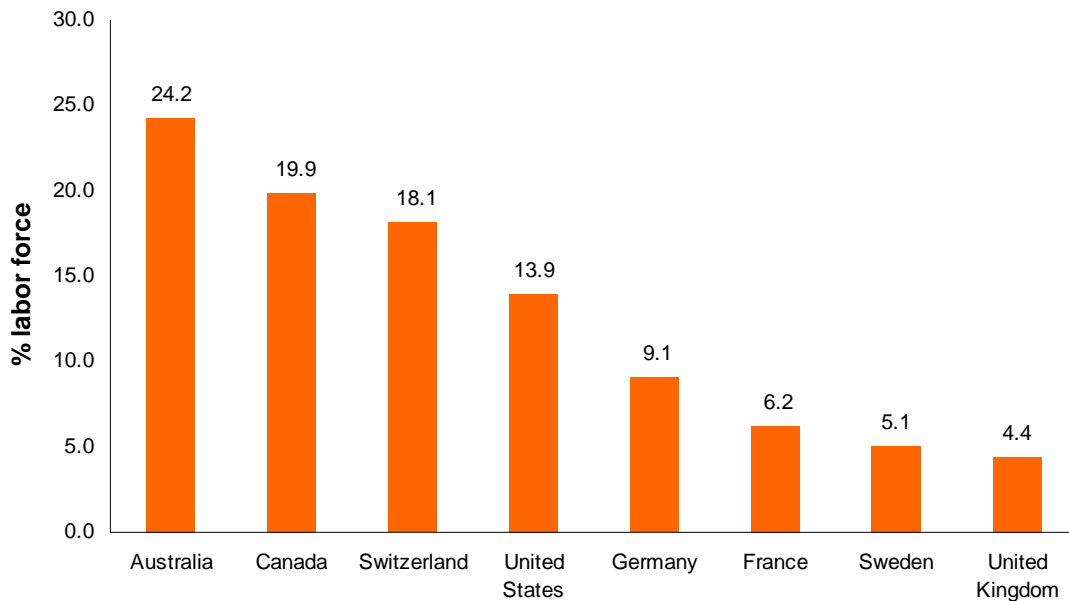


TABLE 1. Immigration as percentage of the labor force, 2001

Source: OECD, Trends in International Migration, International Migration Data 2006

nations, immigrants already constitute an important part of the labor force, ranging from about 4% in the United Kingdom to 24% in Australia.

The United States of America was founded upon the backs of such immigrants, and since then, both her reputation as a land of opportunities as well as her wealth and high standards of living has attracted immigrants from all over the world. For more than a century after independence, there was a policy of almost unrestricted immigration, particularly from Europe after 1840, where domestic political turmoil and US industrialization served as push and pull factors respectively. This continued until the enactment of the Quota Law in 1921, which restricted immigration based on nationality, effectively reducing immigration from the less developed eastern and southern Europe. This was the first major immigration policy spurred by the notion that immigration was harming the native labor market. As shown in Table 2, immigration fell drastically as a result. In 1965,

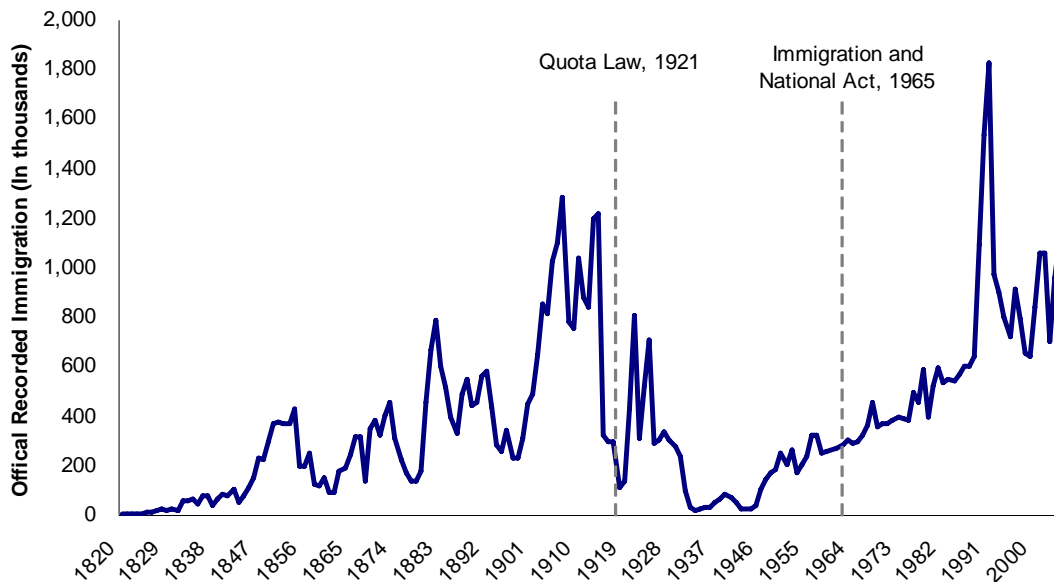
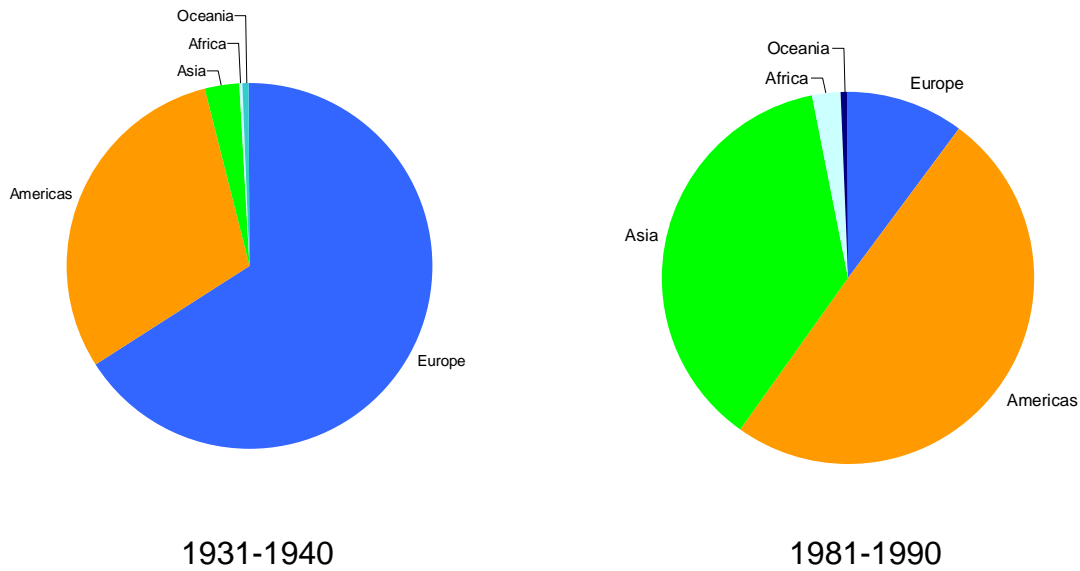


TABLE 2. Officially Recorded Immigration to the United States, 1820-2005

Source: Department of Homeland Security, 2005 Yearbook of Immigration Statistics

the quota by nationality system was finally abolished by the Immigration and Nationality Act, and instead restrictions were placed on total immigration and by purpose of entry. Under the amendment in 1990, about 70% of overall annual immigration is reserved for family reunification purposes, and the remainder for employment and “diversity” purposes. As a consequence of this change as well as political and economic conditions in other countries, the mix of immigrant’s country of origin and ethnicity has shifted significantly across the decades. In particular, the Asia and the Americas, particularly Mexico, have replaced Europe as the dominant source of immigrants to the United States.



**TABLE 3. Origin of Legal Immigrants to the United States**

Source: US Department of Justice. Immigration and Naturalization Services, 1993

Perhaps one of the most important lessons drawn from this discussion is that immigration policy both affects millions of potential immigrants every year and the sociological landscape domestically. It is critical to policy makers to have

a clear understanding of immigrations' economics and dynamics. US takes in more immigrants than all other countries combined, and immigrant flow as a percentage of change in population is estimated by the US Census Bureau to be approximately 42% as of 2005. Nevertheless, a large informational gap exists—the economics of immigration is a young field despite migration being such a perpetual feature of human society. There are still many questions to be explored: what factors affect immigrants' integration? How long does the assimilation take and what are the influencing factors? How does migration affect the natives' employment, and what are the magnitudes of the impact?

In particular, this paper focuses on the wages of immigrants—how do immigrants perform in their host country? What are the factors that influence immigrants' wages and their subsequent growth, and what are the impacts of these factors? Earnings are a measure of how much economic productivity the immigrant adds to the country, and policymakers in particular are concerned that immigrants who do not integrate successfully would be a burden on government programs aimed at aiding the poor. In addition and most importantly, success in the labor market is often associated with other less measurable aspects of integration: health, crime, family, society etc. These factors motivate economists to study the earnings profiles of immigrants.

## **1.2 Recent Developments and Evidence**

There has been much work done in this field in the past decades. Early groundbreaking studies by Chiswick (1978) and Carliner (1980) report that

immigrants' entry wages are significantly less than natives, controlling for socioeconomic characteristics such as education and experience. Even so, immigrants enjoy higher wage growth than natives. Chiswick's (1978) empirical estimates from the 1970 Census data suggests that immigrants earn 17% less than similar natives at entry, but the higher growth allows them to catch up with natives in about 10-15 years. The differential in entry wages is clearly due to the immigrants' lack of skills specific to the US labor market, such as English ability and market knowledge. As the immigrants accumulate US specific human capital, their ability and motivation lead to higher earnings than comparable US workers (Chiswick 1977; 1978). Furthermore, complementarities of US specific labor skills with home labor skills allow a significantly greater return to such investments than natives.

However, Borjas (1985) contradicts these findings. He argues that the cross sectional analysis used in these pioneering studies do not properly reveal the true assimilation impact among different immigrant cohorts with possible quality differentials. The assimilation rates measured in the cross section is biased due to such differentials, and his analysis of earnings within immigrant cohorts shows relatively slow earnings growth for most immigrant groups. In other words, the stationarity assumption in earlier studies that the average "quality" of successive cohorts of immigrants is constant is violated. Due to the institutional changes from the 1965 Immigration and Nationality Act, the average "quality" of the recent cohorts have been falling as entry criteria moves from merit-based occupational skills to family preferences. Immigrants in recent

cohorts are from the bottom tails of less developed countries with greater income inequality. The higher positive wage growth, an economics predictor of the rate of assimilation, captures not just the increase due to US specific human capital, but also the higher quality of earlier immigrant cohorts. In particular, over 1970-1980, the true rate of wage growth for some immigrant cohorts, especially among blacks and Cubans, have been over-estimated by as much as 20%. Thus the catch-up period estimate of 10-15 years may be significantly longer. Much controversy still exists over this issue of declining immigrant quality. Lalonde and Topel (1991) suggests that while there has been a decline in average “quality” of immigrants relative to natives (as measured by wages), there are no decline in quality within immigrant groups. Changes in source country and changes in average years of native schooling accounts for the entire decline in relative immigrant wages— there is no evidence of declining quality within immigrant ethnic groups. Furthermore, they estimate that the catch-up period to natives of *similar ancestry* is consistent with the previous estimates of 10 years, and that the largest wage gains occur for groups with the largest initial wage gap.

Recent studies shed even more light on this issue. Duleep and Regets report the median annual wage growth for immigrants to be 6.7% in 1988, compared to 4.4% for natives (Duleep and Regets 1997). This differential remains even after controlling for specific cohorts and education. In particular, they emphasize human capital as the source for this differential. 13.1% of immigrants were enrolled in school in 1989— more than double that of natives. There are two reasons for their greater investment in human capital: their lower

entry wages means there are less opportunity costs, and source-country human capital is a complement to US-obtained human capital.

The argument extends to intra-immigrant cohorts: Immigrants with low initial skill transferability will therefore invest more in human capital and enjoy higher earnings growth than immigrants with high skill transferability. This thus gives rise to a negative impact of initial earnings on earnings growth. They estimate that a drop of \$1,000 in entry wages is associated with a 1.2% increase in annual wage growth (Duleep and Regets 1999). Therefore, wages of immigrants regardless of country of origin, admission criteria or cohort will gradually converge over time in the United States (Duleep and Regets 1996). This attenuates concerns that immigrants with low initial wages will remain disadvantaged over the rest of their working life.

Stewart and Hyclak (1984) takes a different approach to immigrant wages, concentrating on the effect on earnings of differences in transferability of pre-migration skills, such as source-country education, labor experience, English ability, by country of origin. This study adopts the methodology used by a previous study by Chiswick (1978) which found no significant variance across different country of origins. Using a pooled regression of immigrant from the 1970 Census, he estimates that each year of schooling increases wages by 3%, and that there is no statistically significant difference between returns from schooling in the US and in the source country, thus concluding that education leads to the accumulation of general skills which are highly transferable. Labor market

experience in the United States increases wages by 3%— almost twice as valuable as work experience prior to migration.

However, controlling for these variables, there is significant variance across country of origin as well as race. Male immigrants from the Orient, South America, Mexico, Cuba, Middle East and West Indies earn significantly less than immigrants from Western Europe. He hypothesizes that immigrants from these less developed regions of the world suffer an earnings disadvantage due to perhaps the lower quality of education (controlling for years), limited transferability of skills and a general lack of US labor market knowledge. He does not however exclude the possibility of discrimination. Interactions of origin and years since migration are positive and statistically significant, reflecting differences in transferability of skills across regions, and he estimates that the equalization of wages is about 12-13 years for immigrants from southern and central European countries and longer for other regions.

One particularly disturbing fact that emerged from his study is that there exists a racial wage gap of 9.5% between other immigrants and black and Hispanic immigrants, and the differential actually widens with time. This contradicts the notion that lower entry wages are associated with higher wage growth. Further analysis by race shows that black and Hispanic migrants appear to have lower returns to schooling as well as post-migration experience. This seems to suggest presence of racial barriers in the US labor market, which leads him to exhort the importance of anti-bias employment regulations.

Bratsberg and Ragan (2002) provide a deeper analysis of the differences between returns to schooling in US versus schooling in different source countries. The study reveals an interesting correlation between return to schooling from a particular country with the country's GDP per capita. A \$1,000 increase in GDP per capita increase returns wages by 5.3% for immigrants without an US education. They attribute this increase to the differences in education quality—countries with higher GDP per capital are likely to devote more resources to schooling, and the education systems would be more comparable to international standards and have a greater emphasis on English proficiency. Thus such education would be more transferable to the US job market.

Furthermore, they show that returns to labor market experience and source-country education depends also on US schooling—immigrants who obtain US schooling have higher returns on both. US schooling increase the returns to each year of education by 5.3%. The increase in return to labor market experience with US schooling is 2.5%. This return is still statistically significant after controlling for increase in English proficiency resulting from US schooling as well as time spent in the US during school. This finding can be interpreted as US education upgrades/ validates source country education, and suggest that studies that assume a constant return to foreign schooling may be biased. Combining the findings, they conclude that there is greater propensity for immigrants from less developed countries, who have low transferability of source country education, to invest in US education since they would enjoy a higher return.

Most studies we have discussed thus far have focused exclusively on earnings of men, but economists have also made significant headway in understanding the wage differentials between immigrant men and women. An important finding that contradicts the results discussed above is that earnings of married immigrant women is actually initially higher than US born women, and decreases with time in the United States (Long 1980). Using 1980 Census data, Duleep and Seth (1993) reports and investigates another key anomaly in the labor participation rate of married immigrant women. Immigrant Asian women (with the exception of Japan) are more likely to work than non-Hispanic white immigrant women, despite firstly being more recent immigrants, secondly being less proficient in English, thirdly having more marriage stability (on average), and having more children of preschool-age. Contrastingly, immigrant men from Asian countries initially earn less than European and Canadian (predominantly white) immigrants of similar characteristics. Based upon existing studies, they hypothesize that it is because these initial years are often marked by greater investment in US specific skills.

Putting the pieces together, Duleep and Seth propose a family investment strategy model in determining labor participation and earnings— the husband's decision to invest in human capital or work affects the wife's decision to work. Groups with the largest expected growth in immigrant men's earnings are the groups with the highest participation rate of married immigrant women. Furthermore, the wife's labor participation is negatively correlated with husband's years since migration. In other words, for married immigrants, the decision to

work/ invest is often so at the family level so as to maximize future family income. It may be optimal to separate investment and borrowing roles to smooth family consumption over time. Initially, the wife would work to help support the family while the husband invests in US specific human capital, such as apprenticeships, which offer lower initial income but high future returns. Thus, immigrant women would work longer and more weeks initially, but as their husbands acquire US specific skills, the propensity to work falls. It also implies that immigrant women would be less likely to invest in human capital, instead preferring jobs that pay more initially, resulting in a flatter wage profile.

A separate study by Baker and Benjamin (1997) tests the predictions of the family investment model empirically using an ingenious analysis. Using the 1986 and 1991 Canadian Survey of Consumer Finances, they study the assimilation hours profiles of men and women across four family types, i.e. immigrant husband and native wife, native wife and immigrant husband, both immigrants, and both natives. There is strong statistical evidence that the profiles vary across family types, and that wives in immigrant families work significantly more upon migration than wives in mixed families. Their assimilation effect is negative— in the later stages of the life cycle, immigrant women worked significantly less than their counterparts in native families. The effects for native women in mixed families are statistically insignificant. Immigrant men in both types of families also have significantly lower initial hours than native men. There is no strong statistical evidence that profiles of native women in mixed families and native families differ.

These results clearly support the hypotheses of the family investment model. Due to credit constraints facing immigrant families, it is optimal to divide the roles of borrowing and investing to smooth total family consumption. The individual performing the borrowing<sup>1</sup>, i.e. the wife, would delay training in favor of labor market activity, and the individual performing the investment, i.e. the husband, would be perform the opposite. In native wife-immigrant husband families, the lower initial hours of the husband signifying some form of investment despite no significant change in the wife's profile, indicating credit constraints among the driving force of the family investment model. A further examination of savings rate show immigrant families have significantly lower savings rate than natives shortly after migration, giving further support to this hypothesis.

### **1.3 Focus of this paper**

The aim of this paper is to study main determinants of immigrant earning profiles using new longitudinal data and new techniques to reexamine some of the main questions discussed above—subsequent wage growth, transferability of source country skills, variations across cohort and country of origin, and the family investment model— and consolidate these broad developments into a more coherent and current overview of immigrant earning profiles. Besides the emergence of these theories and evidence, an up-to-date analysis is also necessary because immigration, as a fundamental mechanism of societal

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<sup>1</sup> It is worth questioning why is it the women that performs the borrowing and men the investing, and not vice versa. A brief explanation by Baker and Benjamin suggests that this is possibly due to two factors: the lower wages of women versus men in the labor market and women's advantages in non-market activities.

change, is dynamic and constantly evolving. As we have seen, both the quantitative and qualitative factors have shifted dramatically in response to changes domestically and internationally. Many of results we have discussed above are based upon data from the US Census which dates back many decades, and may or may not be relevant today— how has the “quality” of immigrants changed? Has globalization led to greater transferability of skills internationally? Does the family investment model apply in light of greater gender equality in the labor market? Can we quantify its effects? These are all issues that this paper hopes to shed light on.

## **2. Data Analysis**

### **2.1 The New Immigrant Survey**

One of the main problems that plagued most studies utilizing the US Census is that due to the cross sectional nature of the data, many of the regression estimates are possibly biased. The most well known problem was highlighted by Borjas (1985) in his paper discussing the quality of immigrants. Furthermore, the Census does not differentiate between types of immigrants, such as economic, refugees etc, which can further bias the estimates. Nevertheless, for many years the Census was still the largest and most comprehensive information available on immigrants— there were few other options open, which explains economists continued reliance of this data source.

This study uses data from the New Immigrant Survey (NIS), which is the first nationally representative survey of immigrants in the history of the United

States. It is a multi-cohort prospective-retrospective panel study of new legal immigrants to the United States. The first full cohort was sampled between 2003 and 2004, and forms the baseline survey upon which this study is based. This survey has numerous advantages relative to the Census- the data is firstly focusing exclusively on immigrants, providing information such as visa type, migration history, pre-migration experiences etc. This information is unavailable in other surveys since it is not applicable to non-immigrants. Secondly, the data is longitudinal, and this allows studies to avoid the biases often associated with cross sectional data. Thirdly, the sample is nationally representative of adult immigrants admitted to legal permanent residence, avoiding the sample selectivity bias associated with using a sub-sample of immigrants from other surveys. Fourthly, the survey is the most current information available, and will continue to remain so over the next few years as the results from subsequent waves are released.

This study uses the adult sample of the baseline survey (NIS-2003), consisting of 8,573 immigrants of age 18 or older. They consists of both new arrival immigrants, i.e. those who obtained their immigrant documents abroad, and adjustee immigrants, i.e. those who were previously present in US under a non-PR visa and obtained PR status. Table 4.1 and 4.2 shows the some descriptive statistics of the sample.

From the data, we see that most of the individuals are at of age 30 and above, and that the sample is biased heavily towards the recent immigrants—more than 80% of the immigrants entered the United States after 1990. This is

*TABLE 4.1 Descriptive Sample Statistics-Overview*

Variable	Observations	% total
Total observations	8573	
male	4133	48.2%
female	4440	51.8%
Married in 2003	5856	68.3%
Married when begin work in US	2707	31.6%
<b>Year of birth</b>	<b>Observations</b>	<b>% total</b>
<1950	1318	15.4%
1951-1960	1291	15.1%
1961-1970	2402	28.0%
1971-1980	2858	33.3%
1980+	704	8.2%
<b>Year of entry to US</b>		
<1960	9	0.1%
1960-1969	9	0.1%
1970-1979	68	0.8%
1980-1989	865	10.1%
1990-1999	2449	28.6%
2000+	4534	52.9%
Unspecified	639	7.5%
<b>Highest educational certificate</b>		
High School	1435	16.7%
Diploma/Associates/Bachelors	2241	26.1%
Graduate	1134	13.2%
Total	4810	56.1%
<b>Country of origin</b>		
Europe, Central Asia & Russia	1383	16.1%
East Asia, South Asia, & the Pacific	2717	31.7%
North America	106	1.2%
Central and South America	3165	36.9%
Sub-Saharan Africa	763	8.9%
Middle East & North Africa	391	4.6%
Oceania	31	0.4%
Others	17	0.2%

TABLE 4.2 Descriptive Sample Statistics- Wages

	Observations	Mean	Std Dev	
<b>Education (years)</b>	8295	12.3	4.8	
Europe, Central Asia & Russia	1373	14.5	3.5	
East Asia, South Asia, & the Pacific	2661	13.5	4.1	
North America	106	15.7	4.1	
Central and South America	2994	9.4	4.8	
Sub-Saharan Africa	733	13.8	3.5	
Middle East & North Africa	380	13.7	3.7	
Oceania	31	15.8	4.5	
<b>Pre-migration Labor Experience (years)*</b>	4433	13.1	11.6	
<b>Hourly wages (in US Current Prices, PPP adjusted)</b>				
<i>(By country of origin)</i>				
<b>Current US job</b>	<b>Total</b>	3791	15.3	13.9
Europe, Central Asia & Russia	697	17.5	17.9	
East Asia, South Asia, & the Pacific	1102	19.9	15.2	
North America	59	28.5	15.7	
Central and South America	1435	11.3	9.0	
Sub-Saharan Africa	310	11.5	9.8	
Middle East & North Africa	164	10.3	7.3	
Oceania	16	33.6	24.8	
<b>1st job in US</b>	<b>Total</b>	3528	11.4	12.8
Europe, Central Asia & Russia	700	12.8	13.2	
East Asia, South Asia, & the Pacific	1150	14.5	13.1	
North America	61	23.5	24.9	
Central and South America	1109	7.2	9.9	
Sub-Saharan Africa	317	9.6	13.0	
Middle East & North Africa	168	8.7	6.8	
Oceania	17	23.1	16.8	
<b>Last job prior to entering US</b>	<b>Total</b>	1853	10.8	16.7
Europe, Central Asia & Russia	496	10.9	16.3	
East Asia, South Asia, & the Pacific	648	11.3	16.2	
North America	39	19.9	20.4	
Central and South America	404	8.1	14.7	
Sub-Saharan Africa	173	10.7	15.0	
Middle East & North Africa	73	11.8	19.6	
Oceania	17	29.0	42.4	

\* year last worked at last job before US – year began first job

due to the fact that the sample is representative of legal permanent immigrants in US, and not the entire immigrant population. Only slightly over half of the immigrants have some sort of education certificate. The immigrant origin countries are consistent with the data from Table 3, with Asia and Latin America being the most important sources.

However, we see that immigrants from the Latin America are also the least educated. The average immigrant from other regions of the world has more than 13 years of schooling, roughly the level of a high school graduate, compared with 9 years for the average immigrant from Central or South America. This does not seem to be an effect of the source country characteristic- the average immigrants from Africa, which is the world's poorest continent, has about 13 years of schooling. Instead, this is probably sample selectivity arising due to barriers to immigration. To immigrate from Africa is significantly more difficult than from Latin America, due to distance, costs, cultural factors etc, and thus, the average person from Africa who successfully immigrates to US is probably from the high end of his home country distribution, and vice versa.

Comparing the wages of country-specific immigrants before coming to US and their first job here, we see that the average real wages of most immigrants except those from Europe and Asia fell. This does not necessarily indicate that the standards of living of immigrants are actually lower than in their home country shortly after migration. As the number of observations show, there are many immigrants who have not worked in their home country, and their lower entry wages is pulling down the average of the general cohort.

## 2.2 Analytical Framework

The scope of this study consists of two analyses: entry wage level and subsequent wage growth. This decomposition allows us to avoid some of the pitfalls of using a pooled cross-section regression of years since migration (YSM) on wages as many other studies do as the following argument illustrates.

A normal pooled cross-sectional regression would take the form of the following model:

$$\ln(wages)_i^j = \alpha + \beta.X_i + \gamma.YSM_i + \varepsilon_i \text{ --- (A)}$$

where  $X_i = (\chi_{1i}, \chi_{2i}, \dots, \chi_{ni})$  is a vector of time-invariant socioeconomic characteristics such as country of origin, age, gender etc for immigrant individual  $i$  in cohort  $j$ .  $\beta = (\beta_1, \beta_2, \dots, \beta_n)$  is then a vector measuring of the impact of each respective characteristics, and  $\gamma$  is be a measure of annual wage growth post-migration, which would be a measure of assimilation.

There are significant problems with this model. It is known that unobserved qualitative ability is an important determinant of wages and often correlated with characteristics such as education etc. Without controlling for this variable, the resulting estimates would suffer from omitted variable bias. In particular,  $\gamma$ , which has been the center of the controversy— being the yardstick of immigrant assimilation— would be inaccurate as cross sectional analysis provides only one observation for each individual's wage-time profile. As Borjas illustrates in an example, in 2000, we observe earnings of the 1980 cohort when

they are at age 40 and the earnings of the 1960 cohort when they are at age 60. If the 1960 cohort's unobserved ability is higher than the 1980 cohort, then this model would cause the higher wage *level* of this 1960 cohort to upwardly bias the estimates of the *wage growth rate* of the 1980 cohort. This bias is shown graphically in Figure 5.1. In spite of these issues, previous studies often are limited to such cross-sectional analysis simply due to the lack of available longitudinal data.

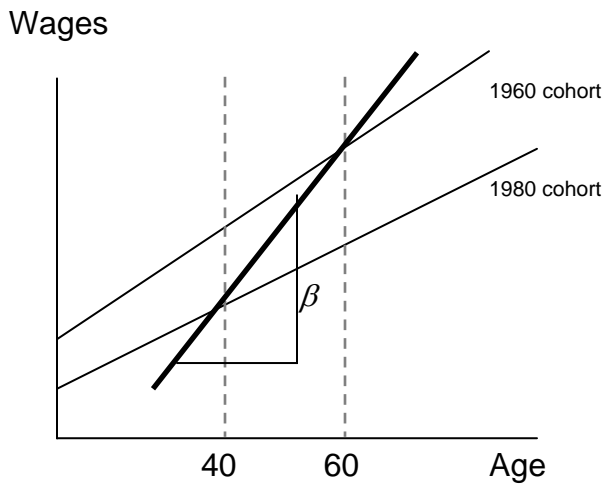


FIGURE 5.1 Cohort Effects on Cross Sectional Analysis

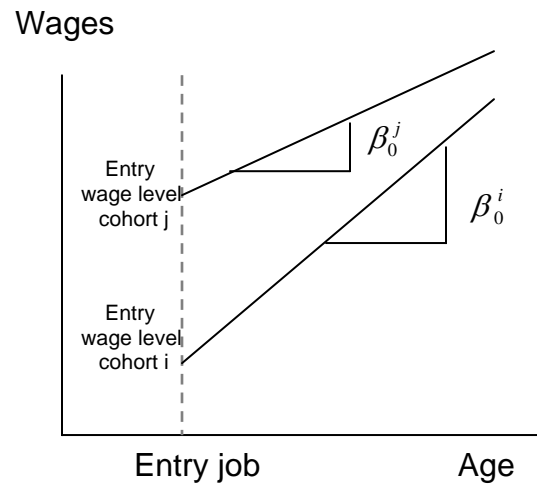


FIGURE 5.2 Decomposition Analysis with longitudinal data

Source: *Economics of Immigration*, Borjas 1980

The use of NIS allows us to neatly circumvent these problems. Although the subsequent longitudinal waves have not been released, the baseline survey includes information on earnings of each immigrant at the following points in time:

- i. First employment after age 16
- ii. Just before leaving last employment prior to immigration

- iii. First began employment post-migration
- iv. Current employment (in 2003)

Using this additional data points, we are able modify the model to perform longitudinal analysis. Returning to equation (A) above and including a time variable  $t$ , we obtain

$$\ln(wages)_{i,t}^j = \alpha + \beta.X_i + \gamma.YSM_{i,t} + \varepsilon_{i,t}$$

At point (iii), the entry wages can be modeled by:

$$\ln(wages)_{i,entry}^j = \alpha + \beta.X_i + \gamma.YSM_{i,entry} + \varepsilon_{i,entry} \quad \text{--- (B)}$$

At point (iv),

$$\ln(wages)_{i,2003}^j = \alpha + \beta.X_i + \gamma.YSM_{i,2003} + \varepsilon_{i,2003} \quad \text{--- (C)}$$

(C)-(B) yields:

$$\ln(wages)_{i,2003}^j - \ln(wages)_{i,entry}^j = \alpha_0 + \beta_0(YSM_{2003} - YSM_{entry}) + (\varepsilon_{i,2003} - \varepsilon_{i,entry})$$

$$\Delta_{2003,entry} \ln(wages)_i^j = \alpha_0 + \beta_0 \Delta_{2003,entry} YSM + \Delta_{2003,entry} \varepsilon \quad \text{--- (D)}$$

$$\frac{\Delta_{2003,entry} \ln(wages)_i^j}{\Delta_{2003,entry} YSM} = \beta_0$$

Since innate ability is by definition time-invariant, this first-differenced equation allows us to remove any such unobserved effects, i.e. the innate “ability” of individual immigrants. Assuming (reasonably) that the change in the idiosyncratic term  $\varepsilon$  is exogenous to change in YSM, then  $\beta_0$  is an unbiased estimator of the immigrants rate of assimilation. Figure 5.2 illustrates this econometric argument graphically. The simplicity of these models belie its

usefulness- building upon these models, it is simple to include further variables to control for various effects, as we shall discuss.

## **2.3 Discussion**

### **2.3.1 Overview of basic results**

Table 6 shows the results of a regression of various variables on the real entry wages of all immigrants, and Table 7 shows the results of a regression on the change in real wages.

The analysis surfaces many issues that are worth exploring. Firstly, we see that males enjoy a significant wage premium, even after controlling for other variables. In particular, males earn 10.7% more than similar females who have the same level of wages pre-migration. In particular, this evidence counters the common argument that males are able to take on jobs with certain requirements (such as high physical ability, long hours etc) that females are unable to, since this disadvantage would extend to jobs abroad. This wage gap shows that there is still a high possibility that females still face various barriers in the US labor market. Married individuals earn about slightly less than single individuals, reflecting possibly a higher selectivity of jobs. For example, a married couple would be less likely to move to obtain a higher paying job than a single individual. We will study the issue of gender wage gaps more closely, including the family investment model, in the subsequent section.

**TABLE 6. Determinants of Entry Wages**

	(1)	(2)	(3)	(4)
Male	0.158 (7.01)**	0.126 (6.06)**	0.126 (4.76)**	0.107 (2.80)**
Married	-0.061 (2.27)*	-0.042 (1.71)	-0.064 (2.13)*	-0.092 (2.14)*
Age	0.004 (2.89)**	0.005 (3.77)**	0.002 (0.81)	0.003 (0.85)
Years in US (Before Work)	0.021 (4.92)**	0.018 (4.49)**	0.031 (4.46)**	0.027 (2.65)**
<b>Highest education (equivalent)</b>				
High School	-0.044 (1.29)	0.027 (0.85)	0.010 (0.25)	-0.020 (0.33)
College/ Diploma/ Some Associates	0.313 (10.87)**	0.262 (9.81)**	0.230 (7.27)**	0.177 (3.82)**
Post-college	0.537 (13.51)**	0.414 (11.14)**	0.409 (9.65)**	0.381 (6.52)**
<b>English</b>				
Spoke English at home at age 10	0.023 (0.59)	0.016 (0.46)	0.028 (0.63)	-0.095 (1.64)
English an official language of home country <sup>^</sup>	0.461 (15.41)**	0.205 (6.87)**	0.233 (6.38)**	0.181 (3.57)**
Attended English classes pre-migration	0.130 (5.66)**	0.083 (3.88)**	0.078 (2.98)**	0.021 (0.57)
<b>Visa &amp; Employment</b>				
Has a sponsor		0.075 (3.01)**	0.051 (1.59)	0.045 (0.97)
Employer-sponsored		0.572 (20.46)**	0.553 (16.33)**	0.574 (11.79)**
Home labor experience			-0.001 (0.38)	-0.004 (0.92)
Log( Wages at last job Before US)				0.071 (6.75)**
Constant	1.642 (29.83)**	1.507 (29.31)**	1.650 (21.45)**	1.701 (14.60)**
Observations	3202	3202	2014	945
R-squared	0.23	0.35	0.35	0.41

Absolute value of t statistics in parentheses  
\* significant at 5%; \*\* significant at 1%

<sup>^</sup>as defined by CIA World Factbook

*TABLE 7. Determinants of Wage Growth*

	(1)	(2)	(3)
Years After 1 <sup>st</sup> job	0.060 (33.68)**	0.057 (32.02)**	0.054 (28.69)**
<b>Change in education</b>			
High School		0.073 (1.04)	0.089 (1.26)
College/ Diploma/ Some Associates		0.513 (8.09)**	0.355 (3.06)**
Post-college		0.535 (10.71)**	0.536 (10.74)**
<b>Years After 1<sup>st</sup> job Interacted with</b>			
High School			0.005 (1.17)
College/ Diploma/ Some Associates			0.021 (1.83)
Post-college			0.025 (4.28)**
Constant	0.079 (6.34)**	0.063 (5.17)**	0.059 (4.78)**
Observations	2602	2602	2602
R-squared	0.30	0.35	0.35

Absolute value of t statistics in parentheses

\* significant at 5%; \*\* significant at 1%

Age at entry to job does not seem to be an important determinant of wages as even though it is statistically significant, the coefficient is close to zero. The amount of time spent in the US before working is also an important determinant— each additional year increases the wage level by 2%. This reflects the effects of assimilation, such as increased familiarity with the US labor market or culture in general.

As there is no direct quantifiable measure of English ability, the analysis includes several proxies that attempt to recreate the language-learning environment, i.e. home, school, society. Before controlling for visa and previous wages, English ability (as proxied) can increase entry wages by more than 60%-even more than if the value of a foreign post-graduate education. Also, according to the results, whether the immigrant is from a country where English is an official language is by far the most important determinant of wages of the three proxies, in terms of statistical significance as well as magnitude, followed by whether one took English classes. Whether one spoke English at home when young does not seem to matter. This suggests an important result: there are no significant economic advantages to being a native speaker of English; it is possible to for non-native speakers to bridge this language gap and master English to match native speakers for work purposes simply through his surroundings and classes.

Furthermore, we see that the coefficients on the English-related variables fall the most first when we control for employment visas and second when we control for previous wages. This is a strong suggestion that English language ability was a strong determinant of wages in the home country. In particular, the coefficient of the dummy for English classes becomes insignificant when we control for wages, showing that the effects of attending English classes has in fact already manifested in previous job wages. Even so, an immigrant with English ability is estimated to enjoy a premium of almost 20% relative to another immigrant of similar demographic, work and visa characteristics. It is unfortunate that the NIS baseline survey does not include comparable measures of English

ability both at entry and current, and thus, we are unable to estimate the effects of improvements in ability.

The coefficient on the employment visa is the largest and most statistically significant of among the results- it increases wages by more than 50%, *ceteris paribus*. This reflects two separate effects: firstly employment by a firm large and established enough to sponsor immigrants, and secondly, ability. It is very likely that immigrants who obtain work visas are more “able” than others. The employer acts as a filter: it is unlikely that they would sponsor an entry visa except for those who are able to contribute significantly to the firm. Although it is usually true that it is usually those who command high wages who obtain work visas, it is not true that the work visa effect reflect this effect of previous earnings: the coefficient does not diminish after controlling for previous earnings and experience. Instead, adding these controls remove the effects of simply having a sponsor. These sponsorships occur for non-market reasons, such as family relationships, and thus the “ability filter” effect is absent. Those who have a sponsor are likely to be slightly better off in their home country than those without (for eg if only families in better economic situation can send someone abroad etc) and thus, having a sponsor has negligible economic effect once we controlling for wages.

Controlling for time-invariant factors, the annual growth rate wages is estimated to be 6.0%, as shown by Table 7. This is slightly lower than the estimate of 6.7% by Duleep (1997) using 1988 CPS data, but still higher than the estimated 4.4% for natives. These findings seem to reinforce the notion that

although immigrants start off at a lower wage *level*, their higher wage *growth* allows them to eventually catch up with natives. As discussed, this is due to the accumulation of US specific human capital over time. To measure the wage effect of non-observable assimilation over time, such as familiarity with US culture, experience in domestic labor markets, network effects, we control for the observable portion of this human capital, education. The wage growth estimate is still 5.4% and considerably higher than the estimate for natives. This indicates that there is indeed some form of convergence between wages of immigrants and natives over time; there is no evidence supporting the pessimistic view that immigrants necessarily suffer from a wage disadvantage throughout their career.

On the returns of education, there is a very surprising result that is consistent across both analyses: there is no significant premium to a high school certificate on both entry wage level and wage growth. Nevertheless, there are still considerable benefits to higher education- controlling for all variables, having some college equivalent education raises entry wages by 18%, and a graduate education raises it by 38%. Post-migration, the effects on wage growth are equally significant. An immigrant who earned some form of college education in the US enjoys an estimated 35% higher wage increase since entry than a similar immigrant who did not. Perhaps more importantly, if we add the interaction variables of time with highest previous education to capture the additional effects of education on wage growth, we see the having a college or better education further increases *annual* wage growth. An immigrant with a post-college degree

on average experiences an increase of 7.9% in wages every year, followed by 7.5% for a college degree holder.

This reinforces the fact that education is indeed a very good investment- there is not simply a signaling effect (in the case which the premium manifests only in the entry wage level and the magnitude of wage change since first job). I argue that there is likely to be two additional effects at work. Firstly accumulation of US specific human capital complements (i.e. increases transferability of) the home country skills. A simple example would be the command of English- an immigrant writer can translate his writing ability in a foreign language; the engineer can make use of software that maximizes his previous experience. This is above and beyond the benefits of better English alone. Secondly, education improves learning ability and adaptability. It is reasonable to assume that the college graduate is a faster learner than a non-graduate, both because he chose to go to college and the college educational experience, and therefore would integrate faster into a new environment.

Having extolled the virtues of education, why then does completing high school education not matter? In general, recent evidence shows that there exists a differential of 20% between high school graduates and dropouts (Card, 2005). Economists highlight two common explanations for this differential. Firstly, it could be that the additional years of schooling has increased ability, and thus driving a productivity difference. Secondly, as discussed, those who chose to complete high school are more able than those who chose not to finish high

school. Therefore, high school completion signals differences in ability through self-selection.

This therefore suggests that these factors may not be applicable directly to immigrants. With regards to the selectivity effect, it should be noted that US has high education levels on average relative to other countries, particularly the less developed. In many less developed countries, simply attending high school—regardless of graduation—is already a signal of above average ability. Thus, the high school graduate versus dropout selectivity difference may be much smaller for such immigrants.

Also it is very likely that most immigrants are taking low-skilled jobs. Keeping this in mind, the gradual shift of production strategy in US to favor high-level skills (commonly termed skill-biased technical change) means that a high school education may not add any major value to one's productivity: high school graduates and dropouts may both be restricted to low-skilled jobs. This effect would be particularly pronounced for immigrants; lacking US labor market familiarity such as job-search skills and negotiation ability, an immigrant with only a high school education is unlikely to be able to obtain jobs notably different than a dropout.

Consequently, due to the nature of low-skilled jobs, there could be no difference in productivity of high-school graduate versus dropout. There is little room to translate the skills learnt in high school abroad into higher productivity. Thus, there may be little productivity differences between high school graduates and dropouts. This effect is particularly pronounced with foreign education. For

e.g., an immigrant from China who works as a dishwasher would find little value in knowing Chinese history or calculus— another similar immigrant who did not finish high school would probably be as productive. In such low-skilled jobs, vocational skills (learnt on the job) are generally more important than general skills. Therefore, employers would view all immigrants without college education as almost perfect substitutes, and will not pay a premium for high school completion.

If this hypothesis was true, we would expect to observe a high school education premium once we control for the nature of the job. Since low-skilled jobs are characterized by low pay, we divide the sample by entry wage level.

Table 8 shows the result of this analysis.

Table 8. Regression results for entry wages by wage level

<b>Highest education level</b>	Hourly wage level	
	<\$10	>\$10
High School	-0.027 (0.61)	0.155 (1.53)
College/ Diploma/ Some Associates	0.086 (2.19)*	0.155 (2.57)*
Post-college	0.130 (2.17)*	0.234 (3.60)**
Observations	563	406
R-squared	0.08	0.26

\*Controlling for all demographic, language, and work variables as in eqn. (4) in Table 6.

We see that for across all levels of education, the premium is much higher for the higher paid jobs, which are generally higher skilled jobs where education would affect productivity. In particular, we observe that the coefficient for high school

education changes from negative to strongly positive— for higher paying jobs, a high school education has a premium of about 15% relative to a dropout<sup>2</sup>. This reaffirms our hypothesis that most of the advantages of graduation from high school is driven down in low-skilled job. Returning to our example, if the Chinese immigrant was a librarian instead of a dishwasher, her knowledge of history as well as better math and foreign language skills would reasonably confer a productivity advantage over a dropout.

Having surveyed a general picture of the determinants of wages and understood some of the new results, we can now turn our attention to some of the existing questions from previous work. In particular, we will study three issues: variations in immigrant quality over time, regional effects and transferability of skills, as well as the family investment model.

### **2.3.2 Declining quality of immigrant cohorts**

Previous economic literatures have suggested that immigrant “quality” could be declining across cohorts. To study this question, we first include dummy variables for different cohorts in our regression to estimate the level effects. We then isolated immigrants by cohorts and regress the wage change for each cohort. However, at this point, we encounter a major restraint in using the NIS. As shown in Figure 9, the distribution of year of entry is not uniform, but heavily skewed towards recent years. This is because the sample is nationally representative of new legal immigrants, which consists of mostly newly arrived

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<sup>2</sup> We observe that there is not much difference between the premiums of HS and college education. This is probably due to the same reason we discussed: we are looking at the subsample of jobs where HS grads and college grads have little difference in productivity.

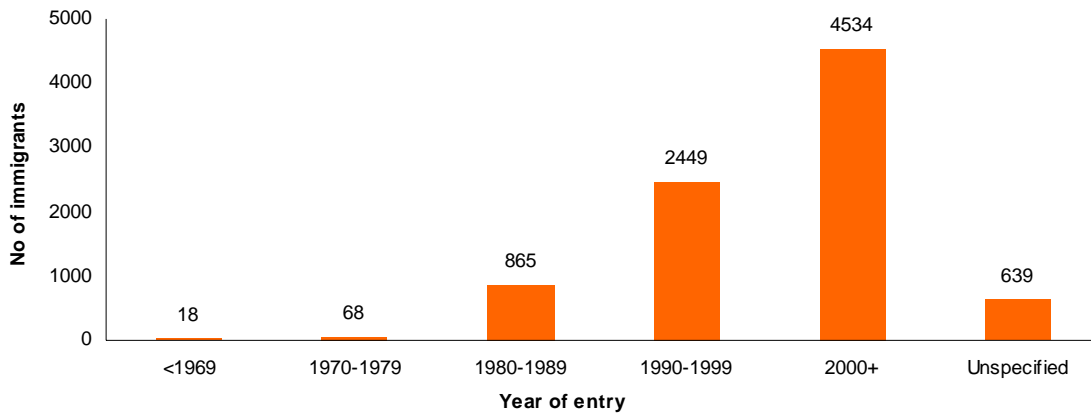


Figure 9. Distribution of immigrants by year of entry

immigrants. Thus to ensure sufficient observations for meaningful results, I divide the sample into three cohorts by year of entry— before 1989, between 1990 and 1999, and after 2000. While limited, the results should still yield some useful insights.

Figure 10 summarizes the educational info and wage information for each cohort, and Table 11 and Table 12 shows the relevant results of the regressions. There does not seem to be a trend in the education level: the 1990-1999 cohort is the most well educated cohort, and before 1989 the least. The regression results in Table 10 for the entry wage level seem to suggest that ability is similarly distributed. Both the 1990-1999 and the 2000 onwards cohorts on average enjoy a considerable 20% entry wage premium relative to the cohort who immigrated prior to 1989. Note that the premium is not due to inflation; the wages have been adjusted to reflect real PPP wages.

In addition to a lower entry wage level, the pre-1989 cohort also has lower growth rate of 4.0% relative to 6.4% for the 1999-90 cohort. The growth rate for the post-2000 cohort at 3.4% seems rather low: this could be due to the lack of

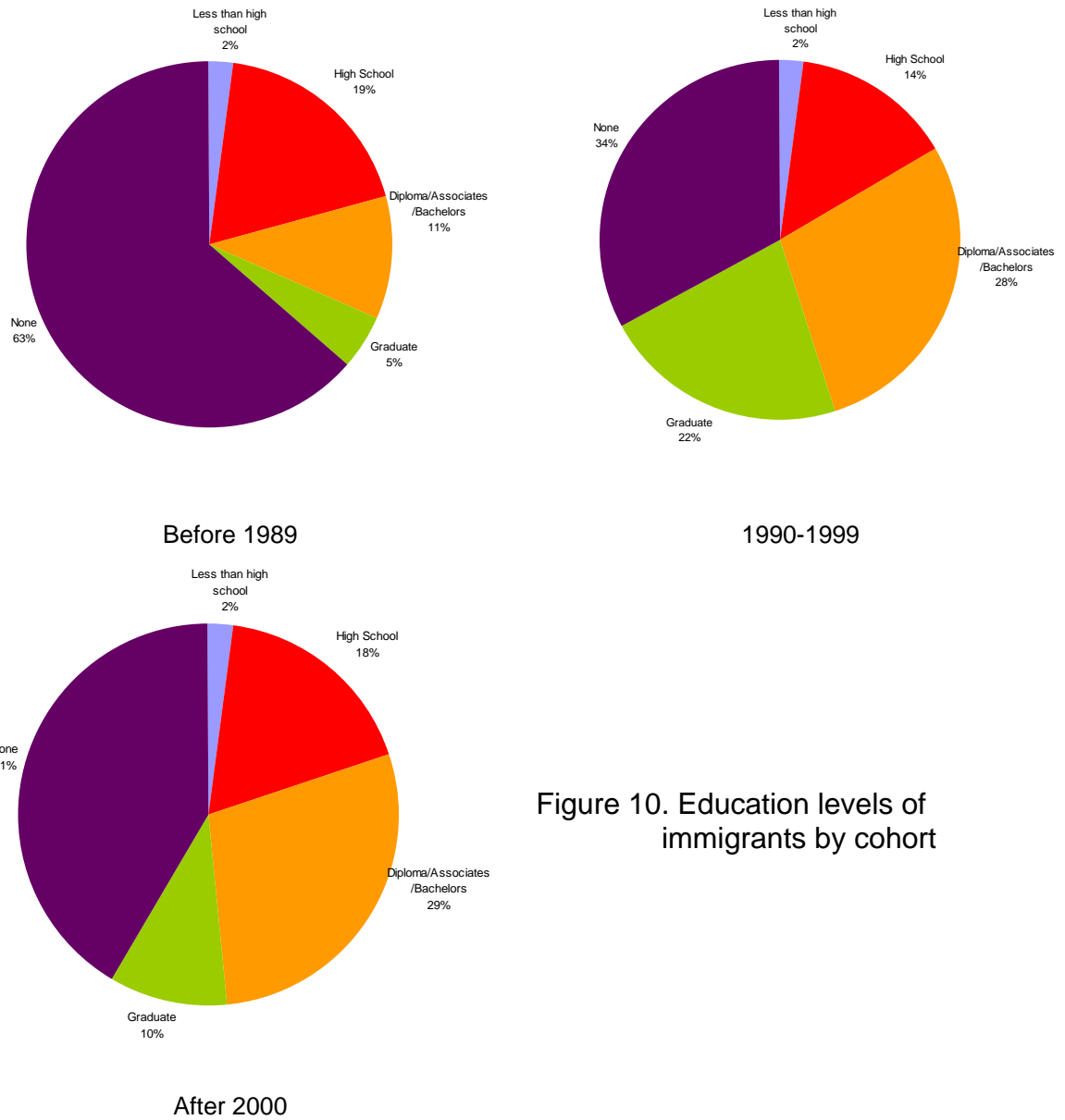


Figure 10. Education levels of immigrants by cohort

variation in years relative to the previous two cohorts, considering the data was collected in 2003. This emphasizes clearly that the growth rate of the pre-1989 cohort does not compensate for the initial differential in level of entry wages. Thus if we were to draw any conclusions, the evidence from this analysis seems to suggest that on average “quality” of the recent cohorts is

Table 11. Regression results for entry wages including cohort variables

Variable	(5)
Cohort between 90 to 99	0.206 (3.29)**
Cohort of 2000 onwards	0.199 (3.30)**
Observations	1023
R-squared	0.41

\*Controlling for all demographic, educational, language, and work variables as in eqn. (4) in Table 6. Cohort who immigrated prior to 1989 is the omitted category

Table 12. Regression results for wage growth including cohort variables

	Cohort		
	Prior to 1989	1990-1999	2000 onwards
Years After 1 <sup>st</sup> job	0.040 (5.21)**	0.064 (12.27)**	0.034 (6.47)**
<b>Change in education</b>			
High School	-0.038 (0.25)	0.038 (0.31)	0.020 (0.10)
College/ Diploma/ Some Associates	-0.042 (0.10)	0.157 (0.73)	0.469 (1.13)
Post-college	0.660 (2.16)*	0.566 (9.17)**	0.129 (0.97)
<b>Years After 1<sup>st</sup> job Interacted with</b>			
High School	0.007 (0.79)	0.011 (1.45)	0.010 (1.32)
College/ Diploma/ Some Associates	0.039 (1.50)	0.049 (1.76)	0.073 (0.67)
Post-college	0.013 (0.63)	0.038 (4.52)**	0.004 (0.34)
Constant	0.285 (2.46)*	0.018 (0.48)	0.053 (5.34)**
Observations	279	994	1218
R-squared	0.17	0.26	0.11

Absolute value of t statistics in parentheses

\* significant at 5%; \*\* significant at 1%

higher than the previous cohort before the 1980's.

This result supports the suggestions that immigrant “quality” vary across cohort, but contradicts the worry that immigrant quality seems to be decreasing over time. However, it is necessary to recognize the strong limitations of these findings. Firstly, the sample size for the pre-1989 cohort is only 279 due to the skewed distribution, and is not sufficiently large to provide strong evidence. Secondly and more importantly, as the NIS is representative of new legal immigrants, the results may suffer from severe sample selectivity. It is reasonable to assume that the more able immigrants obtain legal residency earlier— they are more aware of the benefits, more likely to apply and more likely to qualify— and therefore, the difference in “quality” between cohorts may simply reflect the difference in “quality” between individuals who obtain their legal residency early in their career and those who only obtain it after decades. In other words, the individuals from our pre-1989 cohort sample are a selective subset (of the entire pre-1989 immigrant cohort) which applied for permanent residency many years after migration. Conversely, the post-1989 cohort consists of those that applied for permanent residency sooner after migration. If our hypothesis is true that those who are more able would apply earlier, then this differences we are observing in our analysis is capturing this selectivity effect, and we cannot conclude that there is quality variation across cohorts. Therefore to make further headway on this issue, it is likely that we would have to look to other sources besides the NIS; the nature of the sample selection is a major source of bias in any possible analysis with this data.

### 2.3.3 Country of Origin Effects and Transferability of Skills

There are relatively few studies that have studied wage differentials across immigrants' country or origin. Among one of the pioneering studies by Stewart and Hyclak (1984) indicate evidence that there immigrants from Western Europe earn significant more than immigrants from less developed regions of the world, conditional on various socio-economic characteristics. As the summary statistics show, the education levels of immigrants do vary significantly by country of origin. As discussed, self-selectivity cause the immigrant population to be less representative of the source country population in general the higher the barriers to immigration are. Nevertheless, source country characteristics still have an impact— as showed in Table 4, immigrants from developed regions of the world, namely North America, Oceania, Europe, are the best educated while immigrants from Latin America are the least.

To reexamine the presence of such differentials, we include in our entry wage regression dummy variables for each region of origin<sup>3</sup>. Table 13 shows the results of the basic regression in column (1), controlling for demographics, education, language, cohort, visa and previous work effects. Note that Central and South America is the reference category.

The data reveal surprising results. The coefficients shows that there is no difference in wages for similar immigrants from the Middle East, Africa, and Asia (excluding Central) relative to Latin America, but immigrants from other regions

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<sup>3</sup> While there are data for specific countries in the data, most responses were at the regional level, which is why we are unable to breakdown the information further

Table 13. Regression results on entry wages for country of origin effects  
(with controls)

<b>Region of origin</b>	(1)	(2)	(3)
Europe, Central Asia and Russia	0.254 (4.58)**	-0.109 (0.58)	-0.030 (0.15)
East Asia, South Asia and the Pacific	-0.057 (0.99)	-0.631 (3.54)**	-0.446 (2.17)*
North America	0.145 (1.18)	-1.299 (1.89)	-1.088 (1.58)
Sub-Saharan Africa	0.089 (1.20)	-0.470 (1.27)	-0.278 (0.69)
Middle east and North Africa	0.002 (0.02)	0.490 (0.97)	0.715 (1.26)
Oceania	0.536 (3.00)**	-0.240 (0.29)	-0.164 (0.20)
<b>Years of education</b>	0.031 (5.73)**	0.010 (1.28)	0.010 (1.29)
<b>Home labor market experience</b>	-0.010 (2.41)*	-0.008 (2.04)*	-0.002 (0.46)
<b>Years of education interacted with region of origin</b>			
Europe, Central Asia and Russia		0.028 (2.17)*	0.029 (2.24)*
East Asia, South Asia and the Pacific		0.042 (3.45)**	0.039 (3.14)**
North America		0.090 (2.30)*	0.056 (1.36)
Sub-Saharan Africa		0.041 (1.67)	0.038 (1.53)
Middle east and North Africa		-0.028 (0.85)	-0.031 (0.95)
Oceania		0.051 (1.04)	0.045 (0.83)
<b>Years of home labor market experience interacted with region of origin</b>			
Europe, Central Asia and Russia			-0.007 (1.27)
East Asia, South Asia and the Pacific			-0.010 (1.81)
North America			0.033 (2.18)*
Sub-Saharan Africa			-0.011 (1.29)
Middle east and North Africa			-0.015 (0.89)
Oceania			0.001 (0.02)
Constant	1.195 (9.08)**	1.476 (9.60)**	1.404 (8.86)**
Observations	1018	1018	1018
R-squared	0.45	0.46	0.47

enjoy a considerable wage premiums of between 14.5% and 52.1%. These results reinforce previous findings from Stewart that immigrants from more developed regions enjoy a wage advantage, suggesting that immigrant workers from less-developed countries suffer from less-quality education and/or limited transferability of skills.

To test the hypothesis that the country of origin effects are due to the imperfect transferabilities, we control for education and labor market experience, from different regions of origin. If it was true that skills from different regions have different levels of transferability, we would expect that most of the country of origin effects to disappear once we control for this. Column (2) and (3) shows the results for controlling for education, and education as well as labor market experience respectively. Indeed, we see that the most of the positive country of origin effects diminish significantly once we control for different returns to education from different regions. This clearly shows that the transferability of education does vary by region, and the direction and magnitude of the fall indicates that education in many regions (except Middle East/North Africa) is either more easily transferable and/or of higher quality relative to Latin America. In particular, we see that a North American education has the highest premium; each year of schooling increases entry wages of a Canadian by 9% relative to a Latin American immigrant. For similar high school graduates with 12 years of schooling, this would translate into an entry wage premium of more than 100%. This advantage is consistent controlling for home labor market experience. Each year of North American education still carries the highest value, and each year of

*Table 14. Regression results on wage growth for country of origin effects  
(with controls for education)*

<b>Variable</b>	
Years after 1 <sup>st</sup> US job	0.054 (26.88)**
<b>Years after 1<sup>st</sup> job interacted with</b>	
Europe, Central Asia and Russia	0.013 (2.56)*
East Asia, South Asia and the Pacific	0.002 (0.51)
North America	-0.016 (1.22)
Sub-Saharan Africa	0.006 (0.86)
Middle East and North Africa	0.039 (2.69)**
Oceania	-0.029 (1.11)
Constant	0.053 (4.23)**
Observations	2602
R-squared	0.36

Absolute value of t statistics in parentheses

\* significant at 5%; \*\* significant at 1%

labor market experience from North America carries a statistically significant premium of 3%. While large, this is not surprising- Canada is likely to be the most culturally and politically similar country to the United States, with similar labor market characteristics. Thus it is easier for both the immigrant to identify with the employer and vice versa, greatly contributing to the transferability human capital.

Table 14 shows the results of the analysis on wage growth. There is no evidence that there are differences in assimilation for most countries except Europe and the Middle East regions. In particular, the Middle Eastern immigrants seem to enjoy significantly high wage growth relative to other immigrants, and the estimate is very statistically significant. Returning to the entry wages analysis,

we also note that the Middle East is the *only* region whose education seems to be of less value than Latin America, although this estimate is not statistically significant. Their labor market experience seems to be similarly discounted. Assuming that home country skills have a signaling effect on entry wages and employers eventually reset wages according to productivity, these results seem to indicate that the US labor market may be underestimating the value of skills from this region— the higher wage growth shows that their true productivity is higher than what these “signals” of home education and experience suggest.

Another regional anomaly that can be observed is that among the developing regions, Asia (excluding Central) has the highest returns to education, and the estimate is of high statistical significance. Nevertheless, the region of origin effect is negative and also of high statistical significance. This seems to suggest that although their education is highly valued, immigrants from this region are still underpaid controlling for this effect. There are several possible explanations. From the employee perspective, there could be non-education and non-experience related factors that are not captured in this analysis, such as general unfamiliarity with US work culture or job-search ability. From the employer perspective, there could be the possibility of discrimination. More study will need to be done to properly answer this specific question.

### **2.3.5 The family investment model**

The family investment model suggests that due to credit constraints, immigrants make human-capital investment decisions at the family level, dividing the roles of

borrowing and investing so as to smooth consumption over time. Empirical studies show the wives are usually in the role of the borrower— they take on job that have short-term benefits but with less long term prospects— and husbands are usually in the role of the investor— they take on opportunities that may have less short term rewards but better long term prospects. It is important to note that the model does not imply that married men will have higher wage growth than married women as men and women may have different wage growth rate simply due to gender differences. Instead it implies that being married would confer a wage growth advantage for men (being “subsidized”) and a disadvantage for women (being “subsidizing”).

Summarized, the model offers these two testable hypotheses:

- A. Married men would have higher wage growth than single men.
- B. Married women would have lower wage growth than single women.

To study the empirical validity of the model, we include in our model for wage growth interaction variables of time since first job with a dummy variable for married, and divide the sample into two groups, male and female. From equation (D) in our original model, we obtain:

$$\Delta_{2003,entry} \ln(wages)_i^j = \alpha + \beta_0^j \Delta_{2003,entry} YSM + \beta_1^j \Delta_{2003,entry} YSM .married + \Delta_{2003,entry} \varepsilon$$

$$\Rightarrow \frac{\Delta_{2003,entry} \ln(wages)_i^j}{\Delta_{2003,entry} YSM} = \beta_0^j + \beta_1^j .married$$

for individual  $i$  in cohort  $j$ . As a consequence of the respective hypotheses, we would expect the following:

Hypotheses	Prediction
A	$\beta_1^{male} > 0$
B	$\beta_1^{female} < 0$

Table 15 shows the results of the analysis, controlling for changes in education after the first job. The regressions yield results that exactly match the predictions of the hypotheses. Although the estimate for women is not statistically significant, the estimate for men is, and the signs of the coefficients are as we would expect. Married men enjoy a considerable 2.5% higher wage growth than unmarried women every year, which reflects the effects of the higher investment in human capital, made possible by the borrowing of the wife. Married women have a slightly lower wage growth of .6% relative to single women, which reflect the costs of borrowing. These findings reinforce firstly strong empirical validity of the family investment model, and secondly the general roles of the husband as investor and the wife as the borrower. It is also important to note that the wage advantage to the husband is significantly higher— by more than four times—than the wage disadvantage to the wife. This is perhaps an indication of the economic returns to this family investment strategy.

Extending the framework of this model to include education, we would also expect married men to be more likely to invest in formal education than single men since the part of the cost, such as a fall in consumption level, is offset by the wife. Table 16 shows the breakdown of school attendance by gender and marital status. We see that 14.8% of married men pursue formal education compared to 3.4% of single men, but we also observe that the marriage effect is

Table 15. Regression results on wage growth for marriage effects  
(Controlling for education)

	Cohort	
	Men	Women
Years After 1 <sup>st</sup> job	0.043 (12.85)**	0.054 (13.67)**
Married interacted with years after 1 <sup>st</sup> job	0.025 (7.02)**	-0.006 (1.34)
Constant	0.064 (4.04)**	0.073 (3.92)**
Observations	1593	1009
R-squared	0.39	0.30

Absolute value of t statistics in parentheses

\* significant at 5%; \*\* significant at 1%

not limited to men— married women are also much more likely to pursue formal education than single women! From our previous analysis, we have seen that in general, married women take on jobs with short term rewards but less growth opportunities, but there are important non-market benefits to marriage that are not captured by our analysis. Marriage is not necessarily a one-way channel of resources from the wife to the husband: this observation on formal education shows that there are benefits to both parties. Intuitively, it would be easier for men to attend school if he has a wife who can support the family, but it would be easier as well for the woman to attend school if she has a husband who can take care of the kids when she is away.

If it was true that marriage reduces the burden of education, we may expect that it is not just the quantity of education that increases, but also the quality of the education, which may be reflected in terms of wages. Therefore, there may be additional returns to education for married individuals. To

Table 16. School attendance after 1<sup>st</sup> job by gender and marital status

**Single Individuals**

	Male		Female		Total
Attended school	48	3.4%	50	4.3%	98
Did not attend	1380	96.6%	1118	95.7%	2499
Total	1428		1168		2597

**Married Individuals**

	Male		Female		Total
Attended school	241	14.8%	170	15.7%	411
Did not attend	1384	85.2%	912	84.3%	2297
Total	1625		1082		2708

investigate this hypothesis, I include a dummy variable set to unity if the individual obtained a US educational certificate after his first job and zero otherwise, and an interaction term for this dummy and marriage which would capture this effect. Table 17 shows the results of the regression.

The analysis show that the coefficients on the interaction term of marriage and education are both positive, indicating that there exists additional to returns to education for married individuals. In particular, the wage level of a married man who obtained an educational certificate will be 21.5% higher than a similar single man, controlling for the effects of obtaining the education. Married women also enjoy a premium of 7.4% relative to single women, but it is comparably smaller relative to men and this result is not statistically different from zero. From this observation, we can conclude that marriage does improve the returns to education, although this advantage is much more significant for men than for women. The higher returns can be explained easily: having a spouse to take care of matters such as paying the bills, doing the laundry and cooking etc makes

Table 17. Regression results on returns to education for marriage effects

	Cohort	
	Men	Women
Years After 1 <sup>st</sup> job	0.044 (12.82)**	0.053 (12.92)**
Married interacted with years after 1 <sup>st</sup> job	0.022 (5.85)**	-0.006 (1.29)
Educational certificate after 1 <sup>st</sup> job	0.240 (2.47)*	0.295 (2.90)**
Married interacted with educational certificate after 1 <sup>st</sup> job	0.215 (1.97)*	0.074 (0.63)
Constant	0.065 (4.10)**	0.072 (3.90)**
Observations	1593	1009
R-squared	0.39	0.30

Absolute value of t statistics in parentheses  
 \* significant at 5%; \*\* significant at 1%

concentrating on studies considerably easier, and consequently, one can obtain more out of school (e.g. produce better grades). Why then does the premium lower than for women? A potential explanation lies in social norms. Particularly in most immigrant cultures, women are typically in the role of the house maker. Even given the presence of a spouse, it is likely that the women would perform more household activities than men, i.e. a married woman would probably still bear a greater responsibility domestically than a married man. Thus even though they have an advantage over a single woman in terms of burden sharing, married women would still have less of a premium than married men. This norm may persist due to the comparative advantage women may enjoy in non-market activities.

These evidences reinforce the empirical validity that the decision-making of married individuals is generally at the family level. Married individuals enjoy a significant advantage over single individuals, although the premium for men is larger than for women. Having established this, it is necessary to qualify that the differentials between husband and wife may not be that important— since decisions at the family level are often made to maximize utility of the family as a whole, it is likely that utility is highly transferable between family members. Furthermore, our estimates suggests that there are high returns to the family investment strategy, and the family is better off in general following such a strategy regardless of whoever earns the higher return.

### **3. Conclusion**

Immigration is an important catalyst of change in society and despite being so, there remains much to be done before we can fully comprehend the extent of its impact and dynamics. In particular, this paper has analyzed the economic aspect of immigrant assimilation as it remains the most quantifiable and observable means of measure. Many of the recent developments have been hampered by the lack of availability of longitudinal data. This analysis has sought to present firstly, a new data source- the New Immigrant Survey, and secondly, new analytical techniques made possible by the longitudinal nature of this data as well as its focus on immigrants. These advances promise to remove many of the biases inherent in other studies' results.

The overall results of the data suggest that education, language, demographics, visa and previous work are determinants of wages post migration. As anticipated, mastery of the English language remains an important factor—immigrants who are not native speakers but received formal instruction of the language are surprisingly not penalized. Perhaps the most important and the most enduring of these factors is one's education level as it has significant impact on both entry wages and subsequent upward mobility. The analysis also shows that the nature of the job also affects the transferability of educational skills; immigrants would do well to find jobs that allow best use of their ability.

With regards to issues raised by previous studies, the study generally reconfirms the validity and persistence of many theories. There are still important variations in transferability of skills by region of origin, and immigrants from developed regions—especially Canada—enjoy an advantage over those from less developed region. In particular, Latin America immigrants seem to be penalized the most in terms of transferability. Conversely, Asian immigrants enjoy a high transferability of education but are systematically underpaid once we control for it. Another important result from this study is the empirical validity of the family investment model, and this analysis successfully quantifies the effects. We see that while it is true that married men enjoy a higher wage growth than single men and vice versa for women, the advantage for the husband is significantly higher than the penalty for the wife, and this suggests that the family is on the whole better off under such as investment strategy. Furthermore, we uncover evidence that there are important benefits to marriage, such as on

education quantity and quality, which should be considered along with any evaluation of the strategy.

Having explored the variety of issues, it also becomes clear that whilst the NIS offers many insights into the immigrant experience, it does not promise to be the cure-all. There are limitations to the data, and in particular, the fact that the sample consists of new legal immigrants gives rise to selectivity effects, as discussed when we approached the issue of cohort quality. Economists will still have to look elsewhere for light on certain issues.

In summary, this study has surveyed, identified and quantified the major determinants of the earnings profiles of immigrants. To properly assess the relevance of this information, it is necessary to understand the objective of the US immigration policy. The Immigration and Nationality Act that is currently in place reserves most opportunities for family reunification purposes where the successful economic assimilation of immigrants is not the primary criteria for entry. Why then study their wages? Admittedly wages are not the all and all of assimilation, but it is the most quantifiable and assessable of most measures, and it is strongly established in economic common sense that higher wages are associated with many indicators of wellbeing. Furthermore, most immigrants come in search of a better life, and economic stability provides a strong platform to realize such hopes. While the US thus far has shown tremendous capacity in absorbing immigrants successfully, we should not take it for granted— policies that help catalyze the assimilation of immigrants would in the long run benefit both natives and immigrants.

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