

The Causes of Wage Differentials between Immigrant and Native Physicians

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I. Introduction¹

Current projections, as indicated by the 2000 Census, suggest that racial and ethnic minorities will outnumber non-Hispanic whites in America by the year 2050. Clearly then, immigrants are a vital component of the U.S. labor force and crucial in helping drive the domestic economy. Foreign-born workers occupy all niches of the labor market, from low-skilled workers to physicians, yet there still exists a disparity in wages between them and native workers.

Considering the mass influx of foreign physicians into the U.S. over the last several years, it is important to examine what factors are responsible for the difference in wages between immigrant and native physicians. If earnings do not sufficiently cover the enormous human capital investment made by physicians, the United States could possibly have a shortage for perhaps its most important workers. Moreover, with more and more immigrants making up such a strong portion of the workforce (including physicians), a wage disparity negatively affecting these immigrants may in fact contribute to a shortage. Previous studies looking at the factors affecting wages of all native and immigrant workers are rather copious and in general agreement that current immigrants face lower wages than natives (Borjas, 1994). Studies looking precisely at wage differentials between immigrant and native physicians, however, are in short supply. This study aims to determine some important determinants of the wage differential between native and immigrant physicians

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by applying a human capital framework and Ordinary Least Squares (OLS) regression analysis.

Section II of the paper details the human capital theoretical framework that is central to this study and that is used in the most important previous literature. Then, this literature is discussed in the context of the research problem that immigrant physicians earn substantially less than native physicians in the U.S. The principle hypotheses are also developed following the theory and literature review. Section III describes the data set and the empirical model that is employed to test the hypotheses. Section IV presents descriptive statistics as well as the results obtained from the regression models and discusses important findings. Section V concludes the paper with policy implications and avenues for future research.

II. Theory and Review of the Literature

According to human capital theory, workers receive different wages because all workers possess different sets of skills and abilities that can be contributed to the workforce. In other words, workers have varying amounts of human capital. Generally, human capital is acquired in the form of education and training programs. Schooling, for example, adds to an individual's knowledge "stock", which gives the individual increased skills and abilities which can be used in the labor market. On-the-job training programs, likewise, present workers with an increase in acquired skills that can be used to earn more income than could have been earned without the training (Borjas, 2005).

In the field of immigration economics,

Barry Chiswick's article "The Effect of Americanization on the Earnings of Foreign-Born Men" (1978) is regarded as a classic. The study employs a human capital framework to test for earnings differentials due to country of origin, years in the U.S., and citizenship. The study finds that although immigrants initially earn less, their earnings rise more rapidly and eventually overtake the earnings of native men. The mechanism behind this phenomenon is the "Americanization effect," or, in other words, the ability of immigrants to assimilate into the U.S. labor market. It can then be deduced that recent immigrants, having fewer U.S. specific skills, will earn less than natives, *ceteris paribus*. Yet, as immigrants develop U.S. specific skills through labor market experience, their earnings will rise and, according to Chiswick (1978), overtake those of the natives.

Human capital theory maintains, as reflected in Chiswick's (1978) model, that years of schooling be "decomposed" into years of schooling both before and after immigration into the U.S. Similarly, years of labor market experience must be broken down into experience before and after immigration. By doing this, U.S. specific skills are assessed rather than to a vague measure of general skills. Years of schooling, as well as experience, after immigration to the U.S., should make immigrants more equipped for the U.S. labor market than education and experience before immigration. Rachael Friedberg (1996) assesses this phenomenon, termed the portability of human capital, in her paper, "You Can't Take It with You? Immigrant Assimilation and the Portability of Human Capital." The study finds that foreign and domestic human capital may not in fact be close substitutes. Education and labor market experience acquired within a host country is more valuable to the immigrant, in terms of earnings, than if acquired abroad. Therefore, natives generally earn more than immigrants because they possess country-specific skills that the immigrants initially lack. Earnings parity can be achieved, however, the longer immigrants

reside in the host country and develop the country-specific skills.

Another variable used in studying the causes of wage differentials between immigrants and natives is citizenship status. Chiswick (1978) comments that earnings are not related to citizenship status. Moreover, alien versus naturalized citizen status does not affect earnings despite the theoretical evidence that aliens should earn less than permanent citizens. He claims that aliens earn less only in the instances where they have been in the country for less time than the citizens. Temporary migrants, for example, would spend less time than permanent residents in acquiring U.S. specific human capital. This was tested by holding years since migration constant and observing that there is no significant difference in earnings between the two groups.

George Borjas, a former Cuban refugee himself, is a very prominent figure in the field of immigration economics and criticizes Chiswick's (1978) work for its failure to consider cohort effects. He argues (Borjas, 1994 p. 1672) that waves (or generations) of immigrants may be inherently different in terms of skills and abilities and that wage convergence between immigrants and natives cannot be explained by a "positive cross-section correlation between the relative wage of immigrants and years-since-migration." He proceeds to explain that a change in immigration policy, such as the preferential selection of more-skilled immigrants, creates cohort effects. These differences, he argues, could be responsible for the differential earnings among various waves of immigrants as opposed to actual wage convergence of the immigrants with natives as cross-sections would suggest. Immigrant physicians, however, have similar skills but those skills may not be specific to the host country. If foreign physicians are trained abroad using certain technology and then forced to use the U.S. specific technology upon migration, these physicians will have less U.S. specific skills, leading to fewer perceived skills. Thus, it is appropriate to look not only at

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acquired skills, but also acquired skills that are specific to the host countries.

In sum, Borjas (1994) points out that it is imperative to track immigrants and natives over time to realize the real disparity in wages rather than use cross-sectional data sets because past cohorts may not be representative of modern groups of immigrants in terms of skills and attitudes. Also, the cohort effect may be biased when calculated from Census or longitudinal data due to nonrandom return migration. For example, if less successful workers return to their home country, there would be an overestimate of the rate of wage convergence between natives and immigrants.

Later research goes on to attribute the cause of the difference in wages between immigrants and natives as a relative difference in skills, stating that newer waves of immigrants are less skilled. In other studies, a change in the U.S. wage structure during the 1980's was predicted to affect the wage gap because it did not affect all groups equally. Specifically, there was, according to Borjas (1994 p. 1676) "a sizable wage gap between highly educated and less educated workers." This argument, however, does not apply to immigrant physicians because there is no significant gap between education levels among physicians. Therefore, I will effectively control for these generational components of past models on the grounds that all waves or generations of physicians should be uniform in terms of education levels. Theoretically, whether any of the education was obtained inside the U.S. adds to a physicians' human capital investment in the form of more U.S. specific skills. English proficiency, likewise, is a major human capital investment and should lead to increased wages of physicians inside the U.S. In addition, a wage structure affecting highly educated and less educated workers is meaningless in this study because presumably all the physicians (foreign and native-born) are highly educated.

Following the theory of human capital, I hypothesize that foreign physicians face a

transferability of skills problem that leads to lower earnings in the U.S. Precisely, the U.S. specific skills immigrants acquire are different than those of the natives, creating a wage differential. This could arise from the fact that immigrant physicians are trained differently or from the fact that the technology and techniques used in the training process are different from those in the U.S. It follows that immigrant physicians may have equal abilities and training as native physicians, but not equal U.S. specific skills. This difference, therefore, is hypothesized to be responsible for the wage differentials between immigrant and native physicians.

III. Data and Empirical Model

To test my hypothesis that immigrant physicians face lower earnings than natives due to less U.S. specific skills, I use data from the five percent sample of the 2000 Integrated Public Use Microdata Series (IPUMS) census database. This data set is problematic due to the "top-coding" of the earnings figures at higher incomes, which does not allow for a complete investigation of the existing wage differentials. Yet, there are sufficient observations below the top-code that make the analysis possible. The top-code itself is set at \$175,000 in the IPUMS data set. Any earnings above this value are reported as the mean of all earnings exceeding the top-code from all individuals in the given physician's state of residence. To further focus the study, only physicians under the age of 40 are included. This creates less of a top-code problem. Table 1 presents descriptive statistics for both immigrant and native physicians. It includes the two dependent variables, WAGES and TOPCODE, and it also presents summary statistics for the explanatory variables, including YEARSUS, AGE, and WKSWORKED. The variables used in this study are defined in Table 2.

YEARSUS is the variable of interest and represents the time in which immigrants develop U.S. specific skills that add to WAGES, the

Table 1–Descriptive Statistics for Native and Immigrant Physicians

		Wages	Age	Years in the United States (YEARSUS)	Weeks worked last year	TopCode
Natives	Mean	94436.47	33.34	0	47.17	0.133
	N	8409	8409	8409	8409	8409
	Std. Deviation	98252.838	3.921	0	11.213	0.33954
Immigrants	Mean	72436.6	33.07	13.26	44.16	0.0714
	N	3570	3570	3570	3570	3570
	Std. Deviation	80215.561	3.885	9.957	14.863	0.25758
Total	Mean	87880.04	33.26	3.95	46.28	0.1146
	N	11979	11979	11979	11979	11979
	Std. Deviation	93781.175	3.912	8.145	12.489	0.31857

dependent variable in one of the two models. The longer one lives in the U.S., the more he/she is acquiring these skills. Ideally, variables for labor market experience and education would be “decomposed” to reflect the acquisition of these human capital investments both before and after migration into the U.S. However, data limitations prevent the decomposition of labor market experience and education. In order to treat natives, age is included and reflects their years in the U.S. Also, control variables such as gender and the number of weeks worked during the 1999 sample period are included. Finally, a dichotomous dummy variable reflecting whether an individual is an immigrant or a native appears in the model to test for its overall effect on physician wages.

Language proficiency is not included despite the theoretical suggestions that it should be. Fluency and knowledge of the English language are perhaps the largest U.S. specific

human capital investments that can be made by immigrants toward working in the U.S., but the data indicates that the overwhelming majority of individuals included in the study speak English well. This is probably so because it is only possible to become a physician in the U.S. if an individual can speak English fluently. Communication with patients is a major component of the career, and it is nearly impossible if the physician cannot speak the native language well.

Model 1 tests the effects of YEARSUS, AGE, WKSWORKED, IMMIGRANT, and GENDER on the dependent variable WAGES. The regression equation is represented in equation (1).

$$WAGES = \alpha + \beta_1 YEARSUS + \beta_2 AGE + \beta_3 WKSWORKED + \beta_4 GENDER + \beta_5 IMMIGRANT \quad (1)$$

Model 2 tests the effects of the same explanatory variables on a different dependent

variable, TOPCODE. This is a dichotomous dummy variable with a value of 1 representing individuals whose earnings are in the top-code of \$175,000 or more. This model is included to predict probabilities of individuals entering the top-coded earnings and shows how each of the explanatory variables contributes

Table 2–Variable Definitions and Predicted signs

Variable	Definition
Dependent:	
WAGES	Total pre-tax wage and salary income from the previous year (1999)
TOPCODE	Equals 1 if earnings are in the top-code (\$175,000), 0 otherwise
Independent:	
YEARSUS (+)	Number of years spent living in the U.S. by foreign-born individuals
AGE (+)	Person's age in years
WKSWORKED (+)	Number of weeks worked in previous year (1999)
IMMIGRANT (-)	Equals 1 if individual is an immigrant, 0 otherwise
GENDER (-)	Equals 1 if individual is a male, 2 if a female

to being in this upper income bracket. The coefficients for the explanatory variables are interpreted as the change in the probability of entering the top-code for earnings. Model 2 is represented in equation (2).

$$\begin{aligned} \text{TOPCODE} = & \alpha + \beta_1 \text{YEARSUS} + \beta_2 \text{AGE} \\ & + \beta_3 \text{WKSWORKED} + \beta_4 \text{GENDER} \\ & + \beta_5 \text{IMMIGRANT} \end{aligned} \quad (2)$$

All the models use OLS regressions to test the effects of the independent variables on the given dependent variable. Model 2, having a dichotomous dependent variable, could be estimated using probit or logit models so that all estimates are between 0 and 1. However, this makes the interpretation of the coefficients difficult, so an OLS model is used instead to determine the effects of the explanatory variables on the probability of reaching the top-coded earnings.

IV. Results

The regression results, which are presented in Tables 3 and 4, generally support the hypothesis that immigrant physicians face lower

Table 3 – Native-Immigrant Wage Regression Results

Variable	Model 1
YEARSUS	1055.896 (7.463)
AGE	8060.035 (40.307)
WKSWORKED	1247.427 (19.533)
IMMIGRANT	-29586.849 (-11.678)
GENDER	-22947.056 (-14.516)
Adjusted R ²	0.212
N	11,979

* All variables significant at 0.01 level

wages than natives in the U.S. due to less U.S. specific skills. Table 3 presents the effects of the explanatory variables on the dependent variable WAGES.

Again, YEARSUS is the best proxy for the acquisition of U.S. specific skills since the more time an individual resides within the U.S., the more country-specific skills he/she

will attain. This coefficient, as well as all the others, possessed the hypothesized sign, and all coefficients in Model 1 were significant to the 0.01 percent level. The model yields an adjusted R-squared value of 0.212, indicating that 21.2 percent of the variation in WAGES is explained by the model. This could be improved, perhaps, if data on labor market experience both before and after migration were included as opposed to proxies. Also, the top-coded earnings values distort actual wage representations and may have lowered the R-squared value.

Model 1 includes all the explanatory variables and produces some interesting results. After controlling for age, each extra year an immigrant physician spends inside the U.S. leads to \$1,055 more income. This suggests that extra time spent living in the U.S. does actually add to the attainment of U.S. specific skills through the “Americanization effect” that Chiswick (1978) proposes. This coincides with previous studies on immigrants, such as Friedberg (1996), which obtain similar results for other occupations, and finds that human capital in the form of medical training inside the U.S. is much more beneficial to immigrant physicians than training abroad in terms of earnings.

This model also presents some surprising results. Although the coefficient on the IMMIGRANT variable has the anticipated negative sign, the magnitude of the coefficient is striking. It suggests that being an immigrant physician results in \$29,586 less earnings than being a native, *ceteris paribus*. Similarly, the GENDER coefficient implies that being a male physician in the U.S. adds \$22,947 to earnings, or, conversely, that being a female leads to \$22,947 less earnings. These alarming results point to obvious causes of wage disparities that still exist in our society and should be subject to future research. The effect that being a female immigrant has on earnings could be investigated, for example, to test if the interaction between these variables further reduces earnings.

Table 4 presents the OLS regression results

for the prediction of entering TOPCODE.

In Table 4, the dependent variable changes from WAGES to TOPCODE, shifting the emphasis away from the effect the explanatory variables have on earnings and toward a determination of the probability these variables

Table 4 – Probability of Entering Top-Code Regression Results

Variable	Model 2
YEARSUS	0.003 (5.733)
AGE	0.021 (28.825)
WKSWORKED	0.001 (3.473)
IMMIGRANT	-0.091 (-9.884)
GENDER	-0.084 (-14.637)
Adjusted R ²	0.105
N	11,979

* All variables significant at 0.01 level

have on an individual reaching the “top-code” of \$175,000 and greater. The results are similar to those shown in Table 3. All variables are significant with hypothesized signs and the adjusted R-squared value is 0.105. The downfalls of Model 2 are the same as in Model 1. However, the results offer new insight into the wage disparities between native and immigrant physicians. Being an immigrant, as shown by the IMMIGRANT coefficient, decreases one’s probability of reaching the top-code by 9.1 percent. Being a female, likewise, decreases the probability by 8.4 percent. YEARSUS positively affects the probability of reaching the top-code by 0.3 percent. WKSWORKED also increases the probability by 0.1 percent.

In both models, all coefficients retain the hypothesized signs, are significant, and appear to be robust. Additionally, the results agree with the findings of previous research. Specifically, the “Americanization effect” found by Chiswick (1978) appears to be present today, even among high-skilled physicians. Further, YEARSUS indicates that labor market experience acquired abroad is less valued than experience gained in the U.S., which was also found by Friedberg (1996).

V. Conclusion

The results of this study show that immigrant physicians earn substantially less than native physicians, but wage convergence does occur the longer an immigrant lives in the U.S. An extra year in the U.S. raises the earnings of immigrant physicians by \$1,055. This is because living in the U.S. allows individuals to develop U.S. specific skills that can be applied directly in the labor market. Surprisingly, though, being an immigrant leads to \$29,586 less in earnings, *ceteris paribus*. Likewise, females receive considerably less earnings than males. It would be interesting to test the effects of being a female immigrant physician on earnings for future research to determine if there is a further reduction associated with being in both of these minority groups.

Despite supporting the hypothesis that immigrants earn less due to less U.S. specific skills, both models offer relatively low R-squared values that could be improved by eliminating top-coded values in the data and including variables for labor market experience and education before and after migration. The models, though, indicate that immigrants earn substantially less than natives and females less than males, pointing to possible discrimination in the market for physicians. If this considerable wage disparity does in fact stem from society selectively choosing against seeing immigrant or female physicians, a shortage may be on the horizon, something no nation can afford.

In sum, the possession of country-specific skills, gender, and the amount of weeks worked all contribute to earnings for physicians. Different immigrants have different levels of U.S. specific skills, depending on how long they have been residing in the U.S. The longer one has been living in the U.S., or, in other words, the more one has invested in human capital domestically and not abroad, the higher his/her earnings will be. Some skills and medical training abroad, for example, may not transfer directly or be completely applicable inside the

U.S. As so keenly stated by Friedberg (1996) in reference to immigrants' human capital, "you can't take it with you." Instead, for immigrant physicians to reach earnings parity with natives inside the U.S., the first step may in fact be to invest in their human capital here.

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