

SALARY DIFFERENTIALS BETWEEN NATIVE-BORN AND FOREIGN-BORN FACULTY

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ABSTRACT

Numerous studies have investigated the earning differentials and potential salary discrimination with respect to gender, race and union status across academic faculty in the United States. However, there are very few studies in the literature investigating the compensation structures of native-born faculty versus foreign-born faculty. This paper uses the most recent survey of the National Study of Post Secondary Faculty (NSOPF) conducted by the National Center for Education Statistics in 2004 among over 26,000 faculty and staff members. The widely used Blinder-Oaxaca decomposition shows that there is a 3.5% total salary differential in favor of foreign-born faculty while characteristics account for +7.1% and unexplained factors, which is generally attributed to discrimination, account for -3.6 % (when the decomposition is based on native-born faculty salary structure). This implies that the foreign-born faculty are underpaid as compared to natives. Further investigation of the data reveals that this gap is mainly due to relatively better characteristics of foreign-born but naturalized faculty who represent over 55% of the overall foreign-born faculty sample. *JEL Classifications: J3, J7, Q4* *Keywords: Earning differentials, Faculty salaries, Foreign-born faculty*

INTRODUCTION

The United States has been a country of immigrants and practiced an open door policy from colonial times until the late 19th century with few exceptions to certain ethnicities in some periods. In 1909, the U.S. Immigration Commission Survey of over a half-million wage and salary earners reported that 60 percent of the workers in manufacturing and mining were foreign-born and eventually this finding helped to introduce literacy requirements in 1917. A quota system based on national origin took effect in 1929 in an effort to ease public tension over the alleged depressing impact of the influx of immigrants on earnings of natives. Following the 1965 Immigration and Nationality Act, the United States abolished the national origin based quota system and replaced it with kinship-based immigration as the primary criterion used to ration residency visas. Finally, the Immigration Act of 1990 expanded the legal immigration channels by establishing diversity and employment-based immigration categories with the intention of attracting skilled and talented workers. The Act also implemented the H1-B “specialty occupation” visa for temporary workers employed in certain jobs which require theoretical and practical application of a body of highly specialized knowledge along with at least a bachelor's degree or its equivalent. Specialties such as architecture, engineering, mathematics,

physical sciences, medicine and health, education, and business have qualified under the H1-B provision.

The reality of a continuous flow of immigrants as a result of legal and illegal channels has caused an on-going debate on whether immigrants are depressing the wages of natives. To deal with growing concern about the increasing amount of legal migration as a result of the 1990 act, Congress added various other provisions regulating the employer-based immigration and H1-B temporary work visa in 1991 such as the requirement of a Labor Condition Application (LCA). The LCA is an attestation by an employer seeking to hire a foreign worker that the employer is paying the worker at least the higher of the actual wage paid by the employer to others in the same occupation with similar experience and qualifications or the prevailing wage¹ for the occupation in the geographical area of the work site and that the employment will not adversely affect the working conditions of similarly employed native workers.

The Immigration Acts of 1965 and 1990 altered the traditional composition of new immigrants to the U.S. Due to national origin based quotas prior to the 1965 Act, immigration from European countries was encouraged while individuals from third world countries were discouraged. Between 1965 and 1990, family-sponsored immigration increased the diversity among the new immigrants, the majority of whom belonged to lower socio-economic classes of their societies. The new system benefited the formerly disadvantaged Asian and Latin American population in the U.S and enabled these groups to increase their share in total immigration. Then, the 1990 Act added another element by allowing highly talented and skilled foreigners to immigrate to the U.S. through employment. Today, it is well known that the current immigrants in the U.S. are more likely to be in either the lower or upper tail of prestige in their occupation (Tong, 2006).

The contribution offered by this study is to provide a detailed analysis of salary differential with respect to birth nativity and citizenship by employing the most recent national level data available. This study finds that there is a +3.5% total salary differential in favor of foreign-born faculty of which +7.1% account for endowment differences and -3.6 % account for unexplained factors, which are generally attributed to discrimination (when the decomposition is based on native-born faculty salary structure). This implies that foreign-born faculty are not paid as much as they are expected to be paid given their characteristics compared to natives. Further investigation of the data reveals that this gap is mainly due to relatively better characteristics of foreign-born but naturalized faculty who represent over 55% of the overall foreign-born faculty sample.

LITERATURE REVIEW

Extensive research into the native versus immigrant earnings differential in the U.S. labor market has been conducted. However, scholars are far from a consensus on the magnitude of the gap in earnings, as well as the speed of convergence in earnings. In one of the pioneering work in this area, Chiswick (1978 and 1980) finds that earnings of immigrants who are not refugees tend to catch up to and subsequently surpass those of the native-born at about 10 to 20 years in the United States when other variables, including race and ethnicity, are the same. Chiswick (1978) points that immigrants have relatively high earning growth in this period also notes that the legal status of a foreign-born person whether an alien or

naturalized citizen, has no effect on earnings after staying in the country for a certain number of years. He concludes that foreign-born workers with greater ability, work motivation, and investments in human capital through education and training offset whatever earnings disadvantages they started with. The initial disadvantage could have resulted from discrimination against them or from having less knowledge and skills relevant in U.S. labor markets. Duleep and Dowhan (2002) confirm Chiswick's findings and find that immigrant cohorts generally show higher earnings growth than native cohorts for a major subset of immigrant and native population using longitudinal data covering the period between from 1960 through 1992.

On the other hand, following the Immigration of Act of 1990, Daneshvary (1993) examines the relative earnings of certain immigrants with at least a college degree and finds approximately 7 percent unexplained earnings differential in favor of natives after controlling for the differences in human capital characteristics. Borjas (1985) also challenges Chiswick's findings on an empirical and theoretical basis. He argues that Chiswick's estimates might be unreliable since variation in immigrant quality cannot be detected by cross-sectional data, as nonrandom emigration by immigrants will bias cohort-based analyses. Using time series data, Borjas finds that immigrants' initial wages have declined over time.² Using longitudinal data, Hu (2000) suggests that the rate of growth of immigrant earnings was overstated in Census-based studies and the worsening of immigrant earnings for more recent arrival cohorts is steeper than previously suggested.³

Another potential problem with the Chiswick (1978 and 1980) studies is that they use the data from 1970 census in which most of the foreign-born individuals immigrated to U.S. based on national origin quotas. It is not surprising to find that these immigrants who were mostly white and have European origins could catch up with natives over time. Moreover Chiswick, Le and Miller (2006) report that adult male immigrants had hourly earnings in 2000, on average, around 17 percent less than the native-born males. After controlling for the differences between the birthplace groups in these immigrants' productivity-related characteristics, this gap in mean hourly earnings narrowed, but still remained at around 8 percentage points among recent arrivals. Chiswick, Le and Miller (2006) also report that, in the U.S. labor market, when other factors are held constant, immigrants from English-speaking countries had mean hourly earnings around 12 percent greater than the native born. In comparison, immigrants from non-english-speaking countries had mean hourly earnings around 12 percent less than that of native-born workers.

This finding is in line with the immigration literature that suggests that language is the key factor in determining the assimilation of immigrants into the host country both socially and economically. Chiswick and Miller (1995) show that immigrants in the U.S. who are proficient in English have earnings about 17 percent higher than immigrants with limited English skills, keeping other measured variables the same. Bleakley and Chin (2004) report a significant positive effect of English-language skills on wages among individuals who had immigrated to the United States as children. Bleakley and Chin find that the estimated effect using an instrumental variable approach is greater in magnitude than that suggested by regression strategies that do not address endogeneity and measurement error.⁴ They conclude that there is evidence of substantial downward bias in the OLS estimate due to measurement error and somewhat smaller upward bias due to endogeneity.

As summarized above, scholars have increasingly become interested in exploring and understanding the earnings gap between natives and immigrants for the

last three decades. However, the literature contains very few studies that examine the earnings gap in single labor market by employing disaggregated data rather than census data. This study examines the compensation structure and potential earning differentials between the native-born and foreign-born faculty as well as citizen and noncitizen faculty in the U.S. academic labor market.

There is a consensus in the literature that widespread earnings discrimination (unexplained differentials) exists between male and female faculty.⁵ Some studies also claim that similar differentials can be found between white and non-white faculty as well as unionized and non-unionized faculty.⁶ However, to the author's knowledge only two studies, Monks and Robinson (2000), and Lopez and Mora (2006), examine the issue of earnings differential between native-born and foreign-born faculty.

Monks and Robinson (2000) finds a significant earnings penalty for being a naturalized citizen or noncitizen versus native born citizen. Their study primarily focused on gender and racial differences. They use the data from the 1999 NSOPF survey while this study uses the most recent national level faculty data from 2004 NSOPF survey. Monks and Robinson's findings, in terms of magnitude of earning differentials of citizens by birth, naturalized citizens and noncitizens are generally in line with this study though there are some major differences in terms of directions of the gap. Lopez and Mora (2006) also employs the 1999 NSOPF survey and find that native-born Hispanics earn significantly more on average than their non-Hispanic white counterparts, but foreign-born Hispanics earn the same as non-Hispanics. However, the Lopez and Mora study has some major methodological issues in terms of variables choices such as including part-time faculty in the sample. This caused an overestimate of the earning gap between Hispanics and other faculty as well as within the Hispanic faculty with respect to birth place.

DATA AND METHODOLOGY

This study employs the NSOPF-04 data collected by National Center for Education Statistics (NCES) from a nationally representative sample of 35,000 faculty and instructional staff at 1,080 institutions. About 26,100 faculty and academic support staff completed the survey, either using a self-administered online questionnaire or via telephone interviews during the fall semester of 2003. NSOPF-04 is the fourth cycle of data collections on postsecondary faculty conducted by the NCES. Previous collections were conducted in 1987, 1992, and 1998. As NCES has improved its data collection methods, NSOPF-04 is superior to the earlier sets in terms of variable coverage and quality for a detailed economic analysis. NSOPF-04 provides detailed information on compensation, research productivity, educational attainment, gender, ethnicity, national origin and faculty status.

For purposes of this study, the sample size is restricted to exclude many of the variables as well as some of the observations. The deletions include faculty without rank information (393 observations) and survey participants with no faculty status (1,676 observations). Part-time faculty was also deleted (7,284 observations) as part-time faculty pay is not comparable in most institutions. In addition, faculty with no degree (53 observations) indicated were also deleted as well as the faculty who responded negatively to the citizenship status question (27 observations) but reported that they were native-born. These 27 individuals were deleted due to inconsistency in their responses since every native-born is automatically a citizen. The final sample

used in this study contains 16,207 faculty of which 13,158 are native-born citizens, 1,721 are naturalized citizens and 1,328 are noncitizens.

Second, in order to control for the institution quality per student expenditure and student-faculty ratio variables were created. However, due to high correlation between these variables the student-faculty ratio was dropped as a result of stepwise regression results which indicated that per student expenditure had a higher explanatory power. Third, new variables were created to deal with productivity measures. NSOPF surveys provide the information about various measures of productivity such as refereed journal articles, non-refereed journal articles, books, chapters, art exhibitions, presentations, patents and copyrights. The value or importance of each of these contributions, however, depends on the discipline. As the data set includes heterogeneous disciplines, it might be incorrect to emphasize one or some of these measures. Therefore, productivity indexes were created which are linear combinations of all these various productivity measures by employing principal component analysis. As NSOPF data provide both recent research output and lifetime research output, it was feasible to create an index for overall productivity and recent productivity (number of academic contributions in last two years).

Table 1 provides the descriptive statistics for some selected variables. It is worth noting that most of the variables are significantly different across the groups suggesting that a single equation is not suitable to measure the salary differentials because, using a single regression equation for the whole faculty sample imposes a restriction on coefficients and assumes that the impact of each characteristic on earnings should be the same. However, as it is well established in the literature, single equation in earning differential studies is inappropriate when the characteristics are significantly different between the groups. Therefore the Blinder-Oaxaca decomposition method was applied by employing separate regressions for each subset.

Table 1 indicates that naturalized citizens earn on average \$78,781, significantly exceeding both natives (\$70,685) and noncitizens (\$68,136), raising the average earning for the overall foreign-born faculty cohort. The majority of naturalized citizens and noncitizens obtained their highest degree in the United States (83 % versus 17% among naturalized citizens and 63% versus 37% among the noncitizens). In addition, the majority of naturalized citizens received the graduate degree in the United States and obtained residency through employment-based immigration channels and eventually became citizens 6 to 10 years after their employment. It is well known that most noncitizen faculty follow the same path, as U.S. academic market continues to be the world leader in scientific research and innovations.

However, it is worth noting that the noncitizen faculty set contains three different types of individuals; (1) U.S. educated graduates who stay in the United States after the graduation and participate in the academic market under the Optional Practical Training (OPT) program, under H1-B visa program or under an employer-based green card program, (2) foreign degree holders who come to the U.S under the H1-B visa program or employer-based green card program, (3) foreign faculty who come to U.S educational institutions as visiting scholars under H1-B or J exchange visa program.

There are significant differences in the individual and institutional characteristics across the faculty sets which may be driving the earning differences noted above. Naturalized citizens have significantly higher total research productivity

compared to natives and noncitizens. However noncitizens catch and even exceed the naturalized citizens in recent productivity (within the last two years) and the difference in total productivity can be explained by their lack of experience as they are generally younger and new to academia. Naturalized citizens have more experience and more likely to be tenured and to be full professors whereas noncitizens hold lower ranks, have less experience and higher rate of doctoral degree while they concentrate in funded research. Natives are more likely to be in teaching and administration, unionized, more balanced as to gender and working for institutions with significantly lower per student expenditure.

Monks and Robinson (2000) notes that NSOPF-99 data set reveals a clear gender and racial segregation by field. This study finds a similar pattern in NSOPF-04 data set in terms of nativity. Foreign-born faculty are more likely to be in engineering, natural sciences and life sciences while native-born faculty are more likely to be in education, health, art and humanities disciplines. Table 2 presents in detail the distribution of the faculty sample used in this study with respect to discipline, gender, race and institution type. One interesting point is that foreign-born professors represent almost 50 percent of the Hispanic faculty and an even greater percentage of Asian faculty.

The methodology and variables used to conduct the analysis of this study are rather standard. A semi-logarithmic model is specified in which the log of the sum of annual basic salary and other income from the primary institution employed is the dependent variable. The earning equation used in the computations of the earnings gap is:

$$\text{Logincome} = \alpha + \sum_{i=1}^n X_i + \sum_{j=1}^k Z_j \quad (1)$$

where the X_i represent various personal and human capital characteristics of faculty such as gender (male=1), marital status (single=1), race (white=1), educational attainment measure (bachelors degree is the omitted category), productivity index, ranking (full professor is the omitted rank), experience (defined as the number of years since each respondent completed his/her highest degree), experience-squared (intended to capture the concavity of the experience-earnings profile), primary interest area (teaching, research, clinical or administration; and research is the omitted area) and tenure status (tenured=1). The Z_j are different locational and institutional characteristics such as per student expenditure, geographical location of the institution (west is the omitted region and big-city is the omitted population control variable), type of degree granted by the institution (doctoral granting institution is the omitted type) and disciplines (business is the omitted discipline).

The Blinder-Oaxaca (1973) model can be expressed as:

$$\ln \bar{W}_n - \ln \bar{W}_f = \beta_n (\bar{X}_n - \bar{X}_f) + (\beta_n - \beta_f) \bar{X}_f \quad (2)$$

where \bar{X}_n and \bar{X}_f are vectors containing means of the variables for native-born and foreign-born faculty, while β_n and β_f are vectors with the OLS coefficient estimates for native-born and foreign-born faculty, respectively. The first term on the right hand side captures the wage differential due to different endowments or characteristics of

native-born and foreign-born faculty. The second term captures the wage differential due to the difference in coefficients. The Blinder-Oaxaca decomposition model in equation (2) calculates the wage differential assuming that the first group's wage structure, in this case natives, is the prevailing wage equation. However, just by changing the index numbers in the equation a different wage equation is obtained which uses the foreign-born group as the reference group in determining the wage. Then, the wage gap can be decomposed in the following way:

$$\ln \bar{W}_n - \ln \bar{W}_f = \beta_f (\bar{X}_n - \bar{X}_f) + (\beta_n - \beta_f) \bar{X}_n. \quad (3)$$

In other words, equation (2) implies that in the absence of any type of discrimination, the native-born wage structure would prevail in the market, while equation (3) assumes that it is the foreign-born wage structure that would prevail in a nondiscriminatory environment. Neumark (1988) suggests that this indexing problem can be solved by using a weighted average of coefficients (β^*) instead of β_n and β_f , where β^* is the coefficient vector expected to prevail under a non-discriminatory wage structure. This coefficient vector can be calculated using the sample sizes of native-born and foreign-born faculty sets as weights.

As explained above, the Blinder-Oaxaca decomposition method decomposes earnings differentials into two components; Explained and Unexplained components. Explained component is a portion that arises when two comparison groups, on average, have different qualifications or characteristics (e.g., age or years of schooling) when both groups are treated the same way. Unexplained component is a portion that arises when one group is treated more favorably than the other group while both groups have the same qualifications or characteristics. Unexplained component effect is frequently interpreted as a measure of labor market discrimination.

Some researchers think that the Blinder-Oaxaca decomposition method is not suitable to measure the discrimination as it overestimates the degree of discrimination when the earnings equation fails to include all relevant variables measuring skills and qualifications. Therefore, finding a significant unexplained component effect does not necessarily indicate discrimination but it may be due to unobserved differences in productivity or other characteristics. On the other hand, some other researchers think that the Blinder-Oaxaca decomposition method may underestimate the degree of discrimination effect as they suggest that even the explained component of earnings differential may be the result of inherent discrimination in the labor market. For example, finding that women or blacks (disadvantaged groups) have less "years of schooling" may itself be a result of discrimination. Therefore, the impact of "years of schooling" on earnings differentials might have been higher than what Blinder-Oaxaca decomposition method reveals. In spite of the drawbacks of the Blinder-Oaxaca decomposition method, this method has been frequently used in all types of earnings discrimination studies since 1973 because of its simplicity and flexibility.

TABLE 1
DESCRIPTIVE STATISTICS OF FACULTY SUBSETS

Variables	Native-born	Foreign-born	Naturalized	Non-citizen
Annual Salary	70,685 (38,497)	74,144 (40,051)	78,781 (42,008)	68,136 (36,512)
Productivity Index	19.87 (29.8)	24.03 (33.6)	27.05 (36.5)	20.11 (29.0)
Recent Productivity	2.84 (3.6)	3.91 (4.3)	3.86 (4.6)	3.97 (4.0)
Professor	0.297 (0.45)	0.258 (0.44)	0.350 (0.48)	0.139 (0.35)
Associate Professor	0.234 (0.42)	0.244 (0.43)	0.275 (0.45)	0.205 (0.40)
Assistant Professor	0.242 (0.43)	0.322 (0.47)	0.222 (0.42)	0.452 (0.50)
Instructor	0.129 (0.34)	0.086 (0.28)	0.087 (0.28)	0.085 (0.28)
Teaching	0.663 (0.47)	0.580 (0.49)	0.620 (0.49)	0.527 (0.50)
Research	0.109 (0.31)	0.250 (0.43)	0.178 (0.38)	0.342 (0.47)
Administration	0.112 (0.32)	0.070 (0.25)	0.088 (0.28)	0.047 (0.21)
Tenured	0.487 (0.50)	0.428 (0.49)	0.548 (0.50)	0.273 (0.45)
Union	0.212 (0.41)	0.213 (0.41)	0.239 (0.43)	0.178 (0.38)
Doctoral Degree	0.587 (0.49)	0.765 (0.42)	0.720 (0.45)	0.821 (0.38)
Funded Research	0.304 (0.46)	0.440 (0.50)	0.402 (0.49)	0.490 (0.50)
Male	0.580 (0.49)	0.667 (0.47)	0.645 (0.48)	0.695 (0.46)
White	0.875 (0.33)	0.463 (0.50)	0.420 (0.49)	0.519 (0.49)
Experience	15.62 (11.2)	13.04 (10.6)	16.18 (10.8)	8.96 (8.7)
Per Student Expenditure	30.06 (70.8)	42.93 (92.1)	40.74 (91.1)	45.8 (93.3)
Engineering	0.068 (0.25)	0.144 (0.35)	0.148 (0.35)	0.141 (0.35)
Education	0.100 (0.30)	0.048 (0.21)	0.056 (0.23)	0.038 (0.19)
Natural Sciences	0.087 (0.28)	0.152 (0.36)	0.139 (0.35)	0.170 (0.37)
Sample Size	13,158	3,049	1,721	1,328

Table 1 Note: Mean values are highlighted and Standard Deviations are in parenthesis. Most of the variables are significantly different across the subsets at 1% significance level. For example, all the variables are significant between natives and foreign born faculty except Union, Single and Associate Professor variables and Per Student Expenditure, New Productivity, Instructor and Engineering variables between naturalized citizens and noncitizens.

**TABLE 2
DISTRIBUTION OF FACULTY SUBSETS**

Variables	All	Native-born	Foreign-born	Naturalized	Non-citizen
Male	9,677	7,643	2,034	1,111	923
Female	6,530	5,515	1,015	610	405
White	12,936	11,524	1,412	723	689
Black	1,063	803	260	149	111
Hispanic	874	438	436	286	150
Asian	1,115	190	925	554	371
Other race	219	203	16	9	7
Business and Economics	997	814	183	111	72
Health	2,211	1,866	345	227	118
Education	1,450	1,318	132	81	51
Engineering	1,333	898	435	249	186
Life sciences	1,703	1,275	428	184	244
Natural sciences	1,608	1,148	460	232	228
Social Science	2,380	2,040	340	182	158
Humanities	2,292	1,847	445	276	169
Art	1,027	912	115	59	56
Other disciplines	1,206	1,040	166	80	86
Ph.D. granting institution	8,359	6,446	1,913	984	929
Master's granting institution	3,095	2,599	496	307	189
Bachelor's granting	2,396	2,045	351	199	152
Associate degree granting	2,357	2,068	289	231	58
Total Sample Size	16,207	13,158	3,049	1,721	1,328

The Blinder-Oaxaca model has been used in numerous pay equity studies and decomposition results have been reported repeatedly to prove or disprove the discrimination in various settings. However, researchers usually fail to check the reliability of these findings and this practice raises a question about the robustness of the findings even though the technique is available for a long time. Oaxaca and Ransom (1994 and 1998) show the appropriate methods to calculate the standard errors for the decomposition components. Surprisingly, almost none of the studies examining gender or racial discrimination reported the standard errors of their decomposition findings despite the widespread use of the Blinder-Oaxaca decomposition method. This study provides the standard errors for all decomposition results calculated by the Oaxaca module available for Stata and shows that most of the decomposition results are significant at 1% level or better.

EMPIRICAL RESULTS

Table 3 presents the OLS regression results of selected variables for the full sample and all subsets for comparison. Most of the reported and unreported variables are statistically significant at 1% and all of the significant ones have the expected sign. Unreported variables in Table 3 are instructor and other titles such as lecturer, disability, single, clinical and other duty, professional and masters degree, type of

institution, degree type of the institution, size of the city and most of the regions where the institution is located and some of the disciplines.

A single regression for the whole faculty sample, assuming that the salary structure would have been the same for all faculty, finds that the foreign-born dummy is significant and negative, indicating that the foreign-born faculty are underpaid. A careful examination of the separate regressions reveals that few variables such as rank, union membership and size of the city where the institution located affect the native faculty salaries more significantly than foreign-born faculty salaries. Also, the pay reduction as a result of traditionally low-paying disciplines such as education seems much lower for the natives compared to foreigners in the same disciplines. On the other hand, rank and union status do not seem to affect the salaries of foreign-born faculty significantly. The return from funded projects, tenure status and administrative positions (or penalty for being in teaching) is higher for foreign-born faculty than natives. The results also indicate that the return on productivity seems to be the same across the groups.

As Oaxaca (1973) and Blinder (1973) pointed out these differentials in the coefficients are interpreted as the source of “unexplained earnings differential” or more commonly “earnings discrimination.” However “discrimination” itself has a negative connotation and may be interpreted as a result of the market participants’ intentions or behaviors. That is not the position of this study as this study mainly intends to find the differential without further interpretation or explanation as to why it might be happening. It is worth noting that few scholars suggested that immigrants, particularly Asians in the high-tech industries, may be faced with a “glass ceiling.”⁷ As pointed in the data section, the distribution of Asian faculty between native-born and foreign-born faculty is not proportional as most of them are foreign-born. In order to test the “glass ceiling” hypothesis a separate regression was run for Asian faculty. Interestingly, there is no significant difference between native-born Asians and foreign-born Asians after controlling for all other variables, but there is a substantial and highly significant difference between naturalized citizens and noncitizens among Asians (as high as 30.8% total salary differential of which 18.5% is unexplained).

Table 4 presents the decomposition results for the regression between native-born and foreign born faculty. Table 5 presents the similar results for the regression among the foreign-born faculty only based on citizenship status. Table 4 suggests that there is 3.59% salary differential in favor of foreign-born faculty. However, using the native equation as the reference equation, explained earnings differential which is the expected difference in earnings as a result of differences in endowment is 7.20%. The unexplained portion of the difference could be explained by language barriers⁸, cultural and social differences which may adversely effect the adjustment and networking of foreign-born faculty, or could even be a form of discrimination based on race hidden under the nationality. This result suggests that the foreign-born faculty actually are underpaid compared to their native-born counterparts. There seems to be a 3.37% earning penalty for being foreign-born. As is shown in Table 4 and 5, the total differential stays same regardless of the reference equation but the distribution of the differential may slightly change.

*Salary Differentials between Native-born
and Foreign-born Faculty*

TABLE 3
OLS REGRESSION RESULTS OF FACULTY SUBSETS
Dependent Variable: Log (Annual Salary)

Variables	All	Native-born	Foreign-born	Naturalized	Non-citizen
Foreign-born	-0.031*** (0.010)	----	----	----	----
Productivity	0.002*** (0.0001)	0.002*** (0.0001)	0.002*** (0.0003)	0.002*** (0.0004)	0.003*** (0.0005)
Associate Professor	-0.114*** (0.010)	-0.124*** (0.011)	-0.055** (0.027)	-0.056* (0.031)	-0.081 (0.055)
Assistant Professor	-0.128*** (0.013)	-0.138*** (0.014)	-0.071* (0.037)	-0.072 (0.044)	-0.112 (0.071)
Teaching	-0.101*** (0.012)	-0.115*** (0.013)	-0.070*** (0.026)	-0.107** (0.036)	-0.031 (0.039)
Administration	0.117*** (0.015)	0.095*** (0.016)	0.191*** (0.040)	0.131*** (0.049)	0.272*** (0.072)
Tenured	0.105*** (0.010)	0.095*** (0.011)	0.157*** (0.028)	0.154*** (0.033)	0.126** (0.051)
Union	0.022** (0.010)	0.030*** (0.010)	-0.013 (0.024)	-0.001 (0.031)	-0.031 (0.039)
Doctoral Degree	0.180*** (0.019)	0.182*** (0.020)	0.191** (0.077)	0.264*** (0.098)	0.135 (0.130)
Funded Research	0.084*** (0.008)	0.078*** (0.009)	0.100*** (0.019)	0.073*** (0.025)	0.134*** (0.030)
Male	0.085*** (0.007)	0.084*** (0.008)	0.092*** (0.020)	0.078*** (0.025)	0.123*** (0.032)
White	0.014 (0.009)	0.017 (0.011)	0.008 (0.018)	-0.016 (0.023)	0.054** (0.029)
Experience	0.012*** (0.001)	0.014*** (0.001)	0.004 (0.003)	0.001 (0.004)	0.003 (0.005)
Experience Squared	-0.0002*** (0.00001)	-0.0002*** (0.00003)	-0.0000 (0.00000)	0.0000 (0.00001)	-0.0000 (0.00002)
Southwest	-0.088*** (0.014)	-0.080*** (0.016)	-0.125*** (0.038)	-0.125** (0.048)	-0.141** (0.061)
Midsize city	-0.022*** (0.008)	-0.025*** (0.008)	-0.003 (0.020)	0.011 (0.025)	-0.017 (0.032)
Large town	-0.070*** (0.016)	-0.071*** (0.017)	-0.065 (0.044)	-0.074 (0.063)	-0.043 (0.063)
Per Student	0.0004*** (0.00005)	0.0004*** (0.00005)	0.0004*** (0.00015)	0.0002 (0.00014)	0.0005*** (0.00017)
Engineering	-0.092*** (0.018)	-0.078*** (0.020)	-0.184*** (0.042)	-0.078 (0.052)	-0.344*** (0.069)
Education	-0.204*** (0.017)	-0.172*** (0.018)	-0.366*** (0.053)	-0.282** (0.064)	-0.518*** (0.093)
Natural Sciences	-0.220*** (0.017)	-0.191*** (0.019)	-0.333*** (0.041)	-0.225** (0.052)	-0.495*** (0.068)
Intercept	11.079*** (0.032)	11.057*** (0.034)	11.117*** (0.101)	11.045** (0.129)	11.271*** (0.166)
Adjusted R-squared	0.41	0.42	0.35	0.35	0.34
Sample Size	16,207	13,158	3,049	1,721	1,328

Note: Standard errors are in parenthesis. *** indicates 1% level of significance, ** indicates 5% level of significance and * indicates 10% level of significance.

TABLE 4
DECOMPOSITION RESULTS
Foreign-born Faculty versus Native-born Faculty

	Oaxaca 1	Oaxaca 2	Neumark
Explained Salary Differential (%)	7.20*** (1.34)	6.69*** (0.92)	6.78*** (0.88)
Unexplained Salary Differential (%)	-3.37** (1.33)	-2.90*** (1.05)	-2.99*** (1.01)
Total Salary Differential (%)	3.59*** (1.19)	3.59*** (1.19)	3.59*** (1.19)

Note: Standard errors are in parenthesis. *** indicates 1% level of significance, ** indicates 5% level of significance and * indicates 10% level of significance. Blinder-Oaxaca1 decomposition estimates are based on the average salaries calculated from foreign-born faculty salary equation coefficients. Blinder-Oaxaca2 decomposition estimates are based on the average salaries calculated from native-born faculty salary equation coefficients. Neumark decomposition estimates are based on the average salaries calculated from weighted coefficients from both foreign-born and native-born faculty salary equations.

Table 5 suggests a 16.69% earnings differential between naturalized citizen faculty and non-citizen faculty. Similar to Table 4, using the naturalized faculty salary equation as the reference, 9.27% of this difference is due to the differences in human capital and the rest, 6.74% is due to unknown reasons. This difference could be due to the lack of a chance for full participation in the market as people with visa or even green card cannot be eligible for all the jobs, or institutions may favor American citizens for various reasons.⁹

A separate regression using total income, which includes consulting and other income earned by faculty in addition to the basic and supplemental income from the main institution as the dependent variable, produced somewhat different results in terms of overall salary differential. This model found virtually no overall earnings differential but the decomposition results were in line with the previous model. The new model suggested that there was a +5.0% (p-value < 0.001) characteristics difference in favor of foreign-born faculty which could not be reflected in the earnings due to -5.0% unexplained difference (p-value < 0.001).

In addition, separate regressions by rank, gender and institution type were run to test the significance of unexplained difference. The overall salary differential is significant at 1% level for foreign-born associate and assistant professors (+4.6% and +8.1% respectively) but not significant for full professors (3.9% and p-value = 0.102). The Blinder-Oaxaca decomposition results for ranks also vary. Explained or characteristic difference is significant for all ranks ranging from +4.9% for foreign-born associate professors to +12.7% for assistant professors while it is +7.5% for full professors. However, unexplained difference is only significant for assistant professors at 1% level and for full professors at 10% level.

TABLE 5
DECOMPOSITION RESULTS
Naturalized Faculty versus Non-citizen Faculty

	Oaxaca 1	Oaxaca 2	Neumark
Explained Salary Differential (%)	9.27*** (1.85)	12.25*** (2.35)	10.93*** (1.81)
Unexplained Salary Differential (%)	6.74*** (2.31)	3.90* (2.39)	5.14** (2.13)
Total Salary Differential (%)	16.63*** (2.52)	16.63*** (2.52)	16.63*** (2.52)

Notes: Standard errors are in parenthesis. *** indicates 1% level of significance, ** indicates 5% level of significance and * indicates 10% level of significance. Blinder-Oaxaca1 decomposition estimates are based on the average salaries calculated from naturalized faculty salary equation coefficients. Blinder-Oaxaca2 decomposition estimates are based on the average salaries calculated from non-citizen faculty salary equation coefficients. Neumark decomposition estimates are based on the average salaries calculated from weighted coefficients from both naturalized faculty and non-citizen faculty salary equations.

CONCLUSIONS

The results of this study suggests that there are significant salary differences between foreign-born and native-born faculty as well as between naturalized foreign-born faculty and noncitizen faculty. Further analysis reveals that the higher earnings of naturalized citizens are the main source of discrepancy between the earnings of foreign-born and native-born faculty. For example the overall differential found by this study is around +3.5% between foreign-born and native-born faculty but it is +10.8% between naturalized citizens and native-born citizens and -5.3% between native-born and noncitizen faculty. It is worth noting that most of the differential in first two cases above is due to endowment differences (unexplained differential is small and not statistically significant with p-value > 0.25) while the situation is opposite in the third case (this time explained differential is statistically insignificant with p-value > 0.80).

Numerous faculty have sued public and private universities and colleges over gender based discrimination practices with modest results. Very few lawsuits are filed each year regarding discrimination in earnings based on national origin in higher education. In these lawsuits typically courts rule in favor of the institution because faculty fail to establish the link between salary and promotion decisions and their national origin. Even though this study does not necessarily claim the existence of such discrimination in U.S higher education system, the results of this study are not inconsistent with this possibility.

However, it should be noted that this study may suffer from missing variable bias since the language skill is not controlled in the data. Empirical results reveal that the extent of the earnings differential is substantially greater in teaching institutions

compared to research institutions. Language skill may explain this differential, as it is more relevant in teaching faculty's salary and promotion decisions. This study also finds that significant unexplained salary differentials exist within academic ranks and by gender. The causes of those differentials cannot be identified from this data set and requires further investigation.

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ENDNOTES

1. Employers were allowed to pay as low as 95% of the prevailing wage until 2006. New regulations now require that the worker must be paid at least 100% of the prevailing wage.
2. Despite this concern, this study employs cross-sectional data as one can safely assume that the cohort quality of upper tail immigrants such as the subject of this study, higher education faculty, is not expected to change dramatically over the time.
3. It should be noted that most of these studies use the census data despite the pitfalls as pointed out by Hu (2000).
4. See McManus, Gould and Welch (1983), Kassoudji (1988), Tanier (1988) and Chiswick (1991).
5. See Ashraf (1996), Ashraf, Aydin, & Shabbir (2006), Toutkoushian (1994). Also see Barbezat (2002) and Byung-Shik (1997) for an excellent review of earnings discrimination literature in academia.
6. See Barbezat (1989), Toutkoushian (1998) and Monks (2000).
7. See Lee and Edmonston (1994), Lee(2002) and Fong (1998).
8. Marvasti (2005) suggests that the perceptions about the linguistic ability of foreign-born professors may create a prejudice and may reduce the demand for foreign-born faculty in certain institutions hence lower the bargaining power of them.
9. H1-B visa requirements are very light and the process is easy. In addition, the higher education institutions are not subject to the annual quota. Still, many higher education institutions are reluctant to hire non-citizen or non-resident faculty or new graduates for various reasons. This automatically limits the number of jobs available especially for the graduates from relatively lower ranked schools. On the other hand, legal residents do not have most of these limitations even though they still cannot apply to the governmental jobs as citizenship have increasingly become a strict condition for employment in government agencies after 9/11.