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The Effect of Discrimination On Wage Differentials Between Asians and Whites In the United States: *An Empirical Approach*

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Abstract: Econometric analysis of person-level data from the American Community Survey collected over a 5-year period from 2005-2009 so as to provide *empirical evidence* and *measurable effect of race discrimination on wage differentials between Asian Americans and White Americans*. Brief Methodology of research employed in the study involving analysis of explanatory variables to construct *earnings models* to gather estimates and draw implicative inferences. Utilization of *decomposition* of wage differentials of differences in *education* and *experience* with respect to annual *income* to identify proportion of effects attributable to *endowments* and estimated coefficients; as well as proportion of *effect* as a result of evident *discrimination* via the *Blinder-Oaxaca Decomposition* equation explaining *differences* between groups.

Section I: Introduction

With a population of over 300 million, The United States of America represents one of the most diverse nations in the world. The ethnic composition of the country is still dominantly White at 79.6%,

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12.9% Black and 4.6% Asian. Though representing only 1/20 of the nation's population, Asian Americans have become increasingly representative of the relatively higher earning members of the labor force.

Asian Americans tend towards higher investments on education and the development of human capital relative to all other ethnicities, which subsequently results in greater wages, incomes, and earnings.

Human capital theory as well as traditional labor economic analysis reveal fact-based empirical results that seem to tell the whole story with regard to Asian Americans and increased earnings.

However, the possibility remains that even though Asian Americans, on average, demonstrate higher wages – they may still suffer from the detriments of wage discrimination. The goal of this research study is to employ an unbiased analysis of representative data which demonstrates valid, empirical evidence of wage discrimination as it pertains to Asian Americans. Furthermore, the overall objective is not only to identify evidence of such discrimination but to measure the magnitude and effect it has on earnings.

Section II: Background Information and Literature Review

Asian Americans tend to be viewed as the minority group that outside of appearance, possesses none of the characteristics generally associated with minorities. As opposed to being by and large negatively stereotyped, instead Asian Americans are perceived in a different light. As *Sakamoto & Kim (2009)* explain, "Asian Americans are perceived as distinctive because their socio economic circumstances are not substantially lower than whites, at least on average." Or to put it in more simpler terms, Asian Americans have more or less broken the mold of ethnic minorities and instead are considered as the "model minorities" (*Kitano, 1976*). Whether this title is celebrated is an entirely separate topic of discussion irrelevant to this study's purpose – in reality, such designation is fitting.

There have been a fair amount of notable studies documenting Asian Americans and labor market performance. While some of the studies differ in conclusions, the one aspect that researchers are consistent in concluding is the overall superiority relative to other minority groups in educational

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attainment. As Asian Americans continue to grow in population and remain steadfast in the development of human capital – the question being addressed in the objectives of studies on the subject has shifted from providing reasons for socioeconomic achievement to whether or not Asians have bridged the apparent earnings gap between themselves and achieved parity with the majority White population.

Though Asian Americans in general have made substantial strides towards parity with comparable members of the White population with regard to the labor market, the effect of discrimination in creating wage differentials is a subject that shouldn't be ignored. Prior studies attempting to demonstrate evidence have generally pooled all Asian Americans into the same category when in reality, this may not be appropriate. . Even though the six major groups of Asian Americans (Chinese, Japanese, Koreans, Filipinos, Indians, and Vietnamese) may demonstrate similar characteristics, there are differences that should be acknowledged. Namely, the 1965 immigration policy opened doors that were previously shut to Asian immigrants to migrate to the United States. Vietnamese, Indian, and Korean populations have steadily risen over the last half century as a result; whereas Chinese and Japanese populations had already been fairly established in relative terms. That is to imply, that for those groups who have not lived in the United States for as long have not had the same opportunity to attain endowments increasing human capital. (*Sakamoto, 2010*)

III. Data & Research Methodology

In order to achieve the general purpose of the study and provide implications on the evidence and effect of wage discrimination in the labor market among Asian Americans – data was obtained from the Integrated Public Use Microdata Series (IPUMS). This data consists of observations collected via the American Community Survey for the years 2005-2009. Potentially relevant explanatory variables were gathered for analysis in order to construct economic models so as to draw hypotheses.

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Person-level data was obtained which concerned economic as well as social characteristics that by conventional logic correlate to wages and incomes. Initially, the number of observations retrieved from IPUMS.org was well over 14 million. Initially overwhelming, “data cleaning” was performed by dropping observations irrelevant or potentially causing inaccuracies were dropped. Some examples of dropping criteria included the following; “drop if”: race is not Asian or White, armed forces employment status, currently unemployed/not in labor force, self-employed, income/wages unknown, annual income less than \$20,000 or greater than \$600,000 (potentially outliers), and most notably usual hours worked if less than 37.5 and greater than 60 per week – the focus of the study is on full-time workers so as to provide a sample representative of the labor market with which to make inferences upon.

Methodology behind the study involved constructing earnings models with the dependent variable being $\ln(\text{annual income})$ as regression results provide better interpretations of partial effects, relative to large dollar amount effects as would be seen with annual income. Furthermore, upon construction of earnings models, an analysis of the summary statistics for the explanatory variables within the model was done. The list of explanatory variables that were decided upon for model construction is seen below, followed by summary statistics in table format.

The table of summary statistics which contains the mean for each variable for each respective race included in the study, as well as standard deviation, provides explanation prior to even constructing a model. All Asian groups, except Vietnamese, have higher on average education measured in years of schooling; on top of that, *all* groups exhibit higher mean values for the bachelor's degree dummy variable – indicating a greater proportion of the group have earned a bachelor's degree.

The following list contains explanatory variables used in the constructed earnings models:*

AGE	=	# of Years
EXPER	=	Age – Education – 6 (#Years)
EDUC	=	# of Years
HOURS	=	Hours Worked / Week

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YRSUSA1 = Years in the United States (If IMMIGRANT=1)

"DUMMIES": = **1 IF:**

PUBLIC = Public Sector Employee
 FED = Federal Government
 STATELOCAL = State/Local Government
 MARRIED = Quality
 MALE = Quality
 METRO = Place of Work
 NORTHEAST = Region
 MIDWEST = Region
 SOUTH = Region
 WEST = Region
 LHS = Less than High School
 HS = High School Diploma or Equivalent
 MHS = Some College but no degree
 AD = Associate's Degree
 BD = Bachelor's Degree
 MD = Master's Degree or Professional Equivalent
 PHD = Doctorate
 WHITE = Ethnicity
 IMMIGRANT = Quality
 SPEAKENG = Does *Not* Speak English
 ASIAN = Pooled – Split into 6 separate variables:
 CHINESE JAPANESE
 FILIPINO INDIAN
 KOREAN VIETNAMESE

*Some explanatory variables will not appear explicitly outside of the general description of constructed earnings model estimates (for presentation and length rationales).

Mean Value for Each Race (Standard Deviation in Parentheses)

	(1) White	(2) Chinese	(3) Japanese	(4) Filipino	(5) Indian	(6) Korean	(7) Vietnam~e
lwage	10.76 (0.569)	10.96 (0.613)	10.93 (0.594)	10.74 (0.519)	11.06 (0.635)	10.85 (0.632)	10.73 (0.555)
exper	23.48 (11.70)	19.69 (11.30)	23.53 (11.22)	22.20 (11.51)	16.96 (11.15)	18.86 (11.63)	21.23 (11.60)
Hours/Week	43.36 (8.137)	42.69 (8.091)	43.58 (8.556)	41.41 (7.285)	43.20 (8.590)	43.27 (8.881)	42.37 (7.428)
Age	43.83 (11.48)	41.78 (10.62)	44.98 (10.83)	43.17 (11.38)	39.47 (10.72)	40.47 (11.01)	41.48 (10.85)
Education	14.35 (2.377)	16.09 (2.756)	15.45 (2.088)	14.96 (1.964)	16.51 (2.223)	15.62 (2.426)	14.26 (2.675)
High School	0.244 (0.430)	0.0830 (0.276)	0.107 (0.309)	0.112 (0.315)	0.0576 (0.233)	0.118 (0.323)	0.172 (0.377)
MHS	0.218 (0.413)	0.0793 (0.270)	0.156 (0.362)	0.188 (0.391)	0.0538 (0.226)	0.130 (0.336)	0.171 (0.376)
Associates Degree	0.100 (0.300)	0.0569 (0.232)	0.102 (0.303)	0.104 (0.306)	0.0393 (0.194)	0.0593 (0.236)	0.107 (0.309)
Bachelors Degree	0.245 (0.430)	0.323 (0.468)	0.410 (0.492)	0.474 (0.499)	0.341 (0.474)	0.389 (0.488)	0.304 (0.460)
Masters Degree	0.130 (0.337)	0.297 (0.457)	0.179 (0.383)	0.0882 (0.284)	0.416 (0.493)	0.211 (0.408)	0.109 (0.311)
Doctorate	0.0162 (0.126)	0.113 (0.317)	0.0354 (0.185)	0.00759 (0.0868)	0.0659 (0.248)	0.0643 (0.245)	0.0177 (0.132)
Observations	3364973	46896	13218	42407	38610	14375	17041

Section IV: Empirical Models and Results

Traditional labor economics and human capital theory generally regard educational attainment and job experience (tenure/seniority) as the key determinants of earnings. While there are many other explanatory factors involved in the model [shown once below for demonstrative purposes], the research study focused primarily on education and experience. The first earnings model constructed is as follows:

$$\mathbf{Ln(wage) = b(experience)^2 + b(exper) + educ + educexper + hours + regional dummies + married + male + immig + eng1 + fed + statelocal}$$

With an earnings model constructed, the next step was to run Ordinary Least Squares (OLS) to estimate the model separately for each race involved in the study, with the exception of Whites as they were left out as the reference group. The tables below first demonstrate the results for all Asians (with coefficients for all explanatory variables shown once), followed by each respective subgroup of Asian Americans.

Earnings Model - Asian

```

-----
                (1)
                lwage
-----
exper2          -0.000625***   (-59.43)
exper           0.0536***     (51.24)
educ            0.148***      (116.12)
educexper      -0.00138***     (-26.97)
northeast       0.0945***     (22.14)
midwest        -0.00398       (-0.78)
west           0.0502***     (14.76)
married         0.0896***     (29.66)
male           0.166***      (63.80)
immig          -0.0954***     (-28.03)
engl           -0.115***     (-7.02)
fed            0.0447***     (8.85)
statelocal     -0.139***     (-35.48)
_cons          8.176***      (383.95)
-----
N                152252
adj. R-sq       0.286
-----

```

t statistics in parentheses
Robust Standard Errors
* p<0.05, ** p<0.01, *** p<0.001

Earnings Model - Chinese

```

-----
                (1)
                lwage
-----
exper2          -0.000707***   (-33.35)
exper           0.0539***     (27.45)
educ            0.134***      (57.20)
educexper      -0.000987***     (-10.97)
-----
N                41747
adj. R-sq       0.312
-----

```

t statistics in parentheses
Robust Standard Errors
* p<0.05, ** p<0.01, *** p<0.001

Earnings Model - Japanese

```

-----
                (1)
                lwage
-----
exper2          -0.000691***   (-19.10)
exper           0.0400***     (9.45)
educ            0.106***      (18.68)
-----

```

educexper 0.000104 (0.46)

N 11689

adj. R-sq 0.267

t statistics in parentheses

Robust Standard Errors

* p<0.05, ** p<0.01, *** p<0.001

Earnings Model - Filipino

 (1)

 lwage

exper2 -0.000491*** (-26.77)

exper 0.0482*** (25.50)

educ 0.136*** (48.83)

educexper -0.00151*** (-15.09)

N 36538

adj. R-sq 0.191

t statistics in parentheses

Robust Standard Errors

* p<0.05, ** p<0.01, *** p<0.001

Earnings Model - Indian

 (1)

 lwage

exper2 -0.000668*** (-25.66)

exper 0.0379*** (14.16)

educ 0.133*** (42.43)

educexper -0.000334* (-2.45)

N 34343

adj. R-sq 0.284

t statistics in parentheses

Robust Standard Errors

* p<0.05, ** p<0.01, *** p<0.001

Earnings Model - Vietnamese

 (1)

 lwage

exper2 -0.000811*** (-26.88)

exper 0.0828*** (27.15)

educ 0.180*** (46.18)

educexper	-0.00302***	(-20.48)

N	15426	
adj. R-sq	0.321	

t statistics in parentheses		
Robust Standard Errors		
* p<0.05, ** p<0.01, *** p<0.001		

In drawing comparisons between the sub groups of Asian Americans from analysis of the estimates obtained from the separate regressions, Vietnamese appear to experience the largest returns on education and experience relative to the other Asians. Referring back to the inherent disadvantage of Vietnamese Americans, these findings appear to be logical as the Vietnamese are “catching up” in terms of educational attainment as well as gaining more labor force experience as a group.

Having drawn the implication from the first model that Vietnamese experience greater returns to education relative to other groups of Asian Americans, we construct another model this time instead using dummy variables to capture returns to education using the estimates. Interaction terms wereThe following regression tables, as with the first model above, show the estimates for the separately run regressions. The full set of control variables is seen in the first table only, with the Asian dummy included in the model.

Education Dummies - White		

	(1)	
	lwage	

exper2	-0.000557***	(-303.87)
exper	0.0344***	(403.50)
hs	0.136***	(115.02)
mhs	0.290***	(235.72)
ad	0.350***	(255.43)
bd	0.645***	(499.74)
md	0.872***	(586.34)
phd	0.975***	(356.34)

N	2957125	

adj. R-sq 0.327

t statistics in parentheses
Robust Standard Errors
* p<0.05, ** p<0.01, *** p<0.001

Education Dummies - Asian

 (1)
 lwage

exper2	-0.000592***	(-62.93)
exper	0.0310***	(72.25)
hs	0.0530***	(8.41)
mhs	0.206***	(32.32)
ad	0.295***	(42.17)
bd	0.574***	(95.53)
md	0.894***	(138.81)
phd	0.917***	(113.08)

N 152252
adj. R-sq 0.307

t statistics in parentheses
Robust Standard Errors
* p<0.05, ** p<0.01, *** p<0.001

Education Dummies - Chinese

 (1)
 lwage

exper2	-0.000687***	(-36.65)
exper	0.0378***	(45.08)
hs	0.0629***	(5.15)
mhs	0.279***	(21.41)
ad	0.308***	(22.07)
bd	0.640***	(54.81)
md	0.926***	(77.98)
phd	0.975***	(73.20)

N 41747
adj. R-sq 0.336

t statistics in parentheses
Robust Standard Errors
* p<0.05, ** p<0.01, *** p<0.001

Education Dummies - Japanese

 (1)
 lwage

exper2	-0.000697***	(-20.75)
--------	--------------	----------

exper	0.0422***	(26.61)
hs	0.142***	(3.76)
mhs	0.247***	(6.58)
ad	0.287***	(7.49)
bd	0.614***	(16.56)
md	0.823***	(21.37)
phd	0.764***	(17.25)

N 11689
adj. R-sq 0.282

t statistics in parentheses
Robust Standard Errors
* p<0.05, ** p<0.01, *** p<0.001

Education Dummies - Filipino

(1)
lwage

exper2	-0.000490***	(-28.64)
exper	0.0254***	(31.17)
hs	0.0118	(0.87)
mhs	0.142***	(10.78)
ad	0.265***	(18.51)
bd	0.438***	(33.76)
md	0.716***	(44.14)
phd	0.715***	(18.68)

N 36538
adj. R-sq 0.203

t statistics in parentheses
Robust Standard Errors
* p<0.05, ** p<0.01, *** p<0.001

Education Dummies - Indian

(1)
lwage

exper2	-0.000706***	(-28.90)
exper	0.0346***	(33.37)
hs	0.0404*	(2.12)
mhs	0.186***	(9.41)
ad	0.331***	(15.51)
bd	0.622***	(35.85)
md	0.916***	(52.16)
phd	0.991***	(48.82)

N 34343
adj. R-sq 0.300

t statistics in parentheses

Robust Standard Errors
 * p<0.05, ** p<0.01, *** p<0.001

Education Dummies - Vietnamese

```

-----
                (1)
                lwage
-----
exper2          -0.000597***   (-23.64)
exper           0.0307***     (24.12)
hs              0.0333**      (2.91)
mhs             0.188***      (15.15)
ad              0.262***      (18.55)
bd              0.601***      (47.44)
md              0.922***      (52.02)
phd             1.028***      (28.08)
-----
N                15426
adj. R-sq       0.354
-----

```

t statistics in parentheses
 Robust Standard Errors
 * p<0.05, ** p<0.01, *** p<0.001

Estimates across all sub groups are all evidently similar, and all but one (hs dummy for Filipinos) are statistically significant at the 95% significance level. These results leave little left to be interpreted, there doesn't appear to be substantial evidence of discrimination with regard to return on education relative to the White reference group.

Estimating one more earnings model using the education dummies, however this time we include the Asian dummy as well as an interaction term equal to Asian*(variable). Regression results are seen below.

Education Dummies - Interaction Terms

```

-----
                (1)
                lwage
-----
exper2          -0.000558*** (-309.75)
exper           0.0345***   (410.42)
hs              0.132***    (113.28)
mhs             0.286***    (236.60)
ad              0.346***    (255.05)
bd              0.641***    (502.93)
-----

```

md	0.867***	(589.43)
phd	0.972***	(356.05)
asian	0.0950***	(23.16)
expera	-0.00506***	(-42.34)
hsa	-0.0177***	(-3.94)
ada	0.0155**	(2.92)
bda	0.00200	(0.54)
mda	0.0915***	(21.12)
phda	0.00411	(0.60)

N 3109377
adj. R-sq 0.327

t statistics in parentheses
Robust Standard Errors
* p<0.05, ** p<0.01, *** p<0.001

Analysis demonstrates the interaction terms on experience, high school, associate’s degree, and masters degree are significant at the 99% level of confidence. Beyond that, the Asian dummy demonstrates a positive estimate of the coefficient.

At this point we are able to conclude that the evidently greatest effects for the given set of explanatory variables are most certainly education and experience. From here, we refer to the Oaxaca decomposition to test for evidence of discrimination between whites and Asians. Oaxaca’s decomposition is the process of performing analysis of the difference in wages between two groups, attributing a vector of variables to explain the differences. Finally, weighting an estimate coefficient to determine the non-discriminatory structure of wage obtained from using cross product matrices from the model. Luckily, statistical analysis programs prove to be helpful in these calculations. Results from the Oaxaca decompositions of wage differentials between Asians and Whites follow:

Decomposition of Wage Differentials

(1)
lwage

overall
group_1 10.92*** (7122.62)
group_2 10.78*** (32848.00)

difference	0.136***	(87.05)
endowments	0.114***	(163.33)
coefficients	-0.00510**	(-3.26)
interaction	0.0276***	(35.66)

endowments		
exper	-0.0311***	(-107.54)
educ	0.145***	(198.52)

coefficients		
exper	-0.0845***	(-28.45)
educ	0.166***	(19.74)
_cons	-0.0862***	(-8.34)

interaction		
exper	0.0123***	(27.59)
educ	0.0154***	(19.65)

N 3109377

adj. R-sq

t statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Decomposition of Wage Differentials

(1)

lwage

overall		
group_1	10.92***	(7122.67)
group_2	10.78***	(32848.01)
difference	0.136***	(87.05)
explained	0.115***	(164.53)
unexplained	0.0210***	(15.01)

explained		
exper	-0.0305***	(-107.88)
educ	0.146***	(198.13)

unexplained		
exper	-0.0728***	(-28.70)
educ	0.180***	(18.85)
_cons	-0.0862***	(-8.21)

N 3109377

adj. R-sq

t statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Running two separate decompositions, the first without pooled coefficients, both results attribute a portion of the difference to discrimination that is statistically significant. The first model estimates .0276 significant at the 99% level, roughly ¼ of the difference. The second model, using pooled coefficient estimates is also significant at the 99% level, but about 5% smaller in relative proportion to size of wage differential. We are able to conclude evidence of discrimination that is statistically significant, but hardly a level to be deemed outrageous.

Section V: Conclusion

In a sense, the research study was able to achieve the overall objective of attempting to identify evidence of wage discrimination attributable to race – however, the size of this effect composed but a small proportion of the wage differential between Asian and White men. In fact, Asian Americans as a whole (and dominantly by subgroups, less Vietnamese due to lack of endowments) earn more on average than do the reference group White males. Asian Americans have evidently kept on the path of educational attainment, and are reaping the subsequent benefits as such. In summary, though the research study was able to provide empirical evidence of discrimination through various statistical analysis techniques; the size effect of wage discrimination due to race has been overcome by a manifestation of educational attainment – for full time employees that is.

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