Senior Project
Department of Economics

"Racial Discrimination of Employer Provided Pension Benefits"

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Abstract

The purpose of this analysis is to test the probability of receiving a pension benefit between African Americans and whites in 2010 by using the National Longitudinal Survey of Youth 1979 data, and whether this difference in probability suggests discrimination in the labor force. This analysis also highlights the importance of labor supply factors or human capital differences when looking at racial differences in important components of receiving pension benefits. [1]

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I.   Introduction

There is a significant difference in pensions received between ethnic minorities and whites. According to Yung-Ping Chen (2001), over the 1979-1993 period, documented that white and minority pension coverage rates appear to be diverging. During this time, it was also documented that that minority workers have reportedly been gaining on white workers in the labor market in terms of wages. This trend would make job characteristic profiles between races more similar which in turn would lead to more similar pension coverage rates. However, there is still a significant gap of pension coverage rates between whites and minority workers. Pensions are part of the non-wage benefits that compose about one-third of total compensation[2]. This non-wage difference between whites and minorities has been a popular topic in attempts to explore the possibility of discrimination in the labor force. Gary Becker and other researcher economists have pointed to numerous reasons, including the differences in the way whites and minorities save, historical patterns of differences in wages, job opportunities, tastes and preferences, and access to pension plans, that lead minorities, particularly blacks, to have lower pension income.

When discussing employee compensation, it is doubtful that the majority of studies of discrimination accounts for non-wage compensation. This has not however been due to neglect of plausible information, but merely the paucity of data on fringe benefits as a whole, meaning an entire data set that shows total amount of non-wage compensation acquired. Each individual benefit that an employer provides is very complex in nature and is better suited to study individually rather than as a total of benefits. The fact remains that there are distinct fringe benefit differences between races.

The major studies of fringe benefits have primarily focused on gender discrimination of fringe benefits, the likelihood of receiving pension benefits and or health insurance benefits

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[2] Source: Altonji, Joseph G., and Rebecca M. Blank (1999) "Race and Gender in the Labor Market." *Handbook of Labor Economics. Vol. 3*

between genders. To the best of my knowledge and research, there has not been a study of the probability of receiving a pension benefit between blacks, Hispanics, and whites in the United States. This analysis attempts to build on the study of differences between gender fringe benefit differentials as a basis for studying race differentials.

Given the above information, I would like to continue research into fringe benefits between whites and ethnic minorities including blacks and Hispanics to measure the probability of receiving a pension benefit and to accurately determine the significant factors that increase this probability and whether this gives evidence of labor market discrimination. By measuring the probability, we can better understand why there is a pension benefit difference between these racial groups and what factors contribute to this disparity. Whether or not whites and minorities are more or less likely to receive a pension benefit is an important analysis that also explains possible tendencies that preclude these racial groups from acquiring this benefit. This topic is essential for building onto previous literature that measures gender differences of pensions and other fringe benefits, as well as to better understand the causes and likelihood of receiving a pension benefit. Additionally, it is important to assess the Employee Retirement and Income Security Act (ERISA) of 1974 legislation, which states for an employer to receive tax qualification by the Internal Revenue Service, the pension must satisfy rules aimed at ensuring that it does not discriminate in favor of highly compensated employees.[3]

II.   Literature Review

Gary Becker (1971) modeled various important theories of discrimination. Discrimination in general is defined as a situation in which persons who provide labor market

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[3] Even, William, and David Macpherson (1994), "Gender Differences in Pensions." *University of Wisconsin Press.* 29.2, 555-587.

services and who are equally productive in a physical or material sense are treated unequally in terms of income and demands for services in a way that is related to an observable characteristic such as race, ethnicity, or gender[4]. Becker uses this framework to explain the various components of discrimination including employer, employee, and consumer discrimination. Joseph G. Altonji and Rebecca M. Blank's "Race and Gender in the Labor Market," discuss effects of different wages associated with both gender and race. In section 8, they discuss gender differentials in fringe benefits which include pensions and health insurance. The purpose of this analysis explains that when measuring income and wages, it is important to include fringe benefits since these benefits are a source of income given through your employer. Vella (1993) explains that using wage rather than full compensation can result in misleading results in labor supply elasticities. Even and Macpherson (1990, 1994) measures the male/*female* gap in the likelihood of receiving a pension. Much of the gap among those who have pensions is largely explained by gender differences in income.

It is important to discuss the purpose of including fringe benefits when determining wage discrimination. Benefits that are acquired through your employer are a source of income and should be taken into account. It is worth noting that data on fringe benefits as a whole, as described above, are not accessible for evaluating differences by race, gender or other important individual level variables. Therefore, these account for previous studies focusing on one or two primary fringe benefits like pensions or health insurance. Vella (1993), as described above, shows that using wages without accounting for fringe benefits can have misleading results. Additionally, as the amount of hours worked per week is increased, the average hourly rate is decreased due to increasing marginal rates of taxation. When accounting for fringe benefits, the employee maintains a constant hourly true wage since these benefits are non-taxable income. By not accounting for fringe benefits, the employees wage is a nominal value or misleading in terms

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[4] Source: Altonji and Blank (1999)

of total compensation. This study also finds that some of the male/female difference in non-wage compensation relates to the human capital and productivity differences between workers of different genders and some relates to differences in the characteristics of jobs held by men and women, and some of it is remained unexplained, which could be categorized as discrimination. Thus, previous studies that observe wages only would not be an accurate estimation and should be augmented by non-wage labor income. Even and MacPherson (1994) look at gender differences in pension coverage and found that changes in the earnings and types of jobs held by men and women of varying levels of education accounts for the disparity of pension coverage. Other determinants include lower income, job tenure, unionization, and full time work characteristics that were all shown to have an important makeup of the wage gap. Also discussed is the effect of marriage and fertility on pension benefits, which seem to have no negative impacts.

Even and Macpherson (1994) stress the importance of advantages of pensions relative to private savings. First, the pensions provided through your employer have significant tax advantages in the sense that contributions to the plan and any interest accumulated are untaxed until the money is withdrawn at retirement and has a higher limit on contributions when compared to an Individual Retirement Account (IRA). Second, defined contribution plan where the employer and/or employee contribute a defined amount on a regular basis do not impose penalties on workers that quit prior to retirement. This information shows that a pension is a significant source of earned income and most employees that are offered a pension would accept unless exogenous reasons fulfill their preferences as described in the data section.

Before assessing whether there is a difference in probability in receiving a pension between white and black individuals, it is important to explain key concepts that would undoubtedly increase or decrease the likelihood of receiving a pension. Even and MacPherson (1994) also designated the term "back dropping," which refers to employer turnover rates. The

higher the turnover rate a gender or race is asserted, the lower the amount of pension benefits the social class will receive compared to others. If black and white turnover rates are significantly different, this could have substantial effects on pensions received.

Other variables that are most important include education of the individual. Education is highly important due to the fact that educated individuals tend to have higher wages than non-educated individuals. This would give reason to believe that the choice and or opportunity to receive a college degree can more narrowly explain the probability gap. Kiker and Rhine (1987) found that the ratio of fringe benefits to total compensation increases with increases in higher education, particularly for males, and experience. Also, is positively and strongly related to working in a white-collar occupation. Also, they found that males with an additional year of experience at the mean would earn approximately 1.0 percent more in wages and 1.2 percent more in total compensation.

Levy (2006) used the Current Population Survey (CPS) to examine the gender differences in health insurance and found that the inclusion of health insurance results in a smaller estimate of gender compensation inequality than one that is solely based on wages. Health insurance is a substantial part of total fringe benefits. According to Levy, nearly 25 percent of fringe benefits were due to health insurance. However, other fringes including paid vacations, pensions, and legally required benefits made up the remaining total non-wage compensation in the private sector. DeVaney and Anong (2007) concluded that when controlling for *income* differences, racial and ethnic minorities are less likely than whites to participate in employer-sponsored *health insurance*. Pensions, like health insurance, show the same trends between races.

Levy (2006) also explains that if the gap between other fringes and wages is at least one-third as large in absolute value as the gap between wages and health insurance, including other fringes in the calculation will yield an estimate of compensation inequality larger than measured wage inequality. This explains that the overall total compensation gap might in fact be larger

than the wage gap. This is not suggesting that this analysis will control for every fringe benefit, as data would limit that kind of study. Solberg and Laughlin (1995) explain that including fringe benefits makes a considerable difference in the analysis of earnings differentials. They conclude that any measure of earnings that excludes fringe benefits may and will produce misleading results as to the existence, magnitude, consequence, and source of market discrimination. Their study was one of the few that estimated separate earnings by occupational category. They also conclude that occupational assignment is the primary determinant of the gender difference in compensation.

In addition, this research attempts to fill the gap that the literature does not explain. This analysis will focus on pensions as an attempt to explain the probability of receiving a pension benefit amongst black and white individuals. As mentioned in the literature, the combination of race and pension benefits has not been analyzed. Moreover, an up to date study measuring probability of receiving a pension in the year 2010 is an important analysis when comparing to Even and Macpherson (1994). This gap in the literature also includes using the NLSY79 data which none of the literature uses which also coincides with the dependent variable used as an offer rate rather than a coverage rate. The analysis also includes finding what components of racial differences increase or decrease this probability.

III.   <u>Theory</u>

For this analysis, employer discrimination will be used in defining probabilities of receiving pensions in the sense that pensions are provided through your employer. Furthermore, we can ascertain that discrimination through your employer is defined by Becker as a situation in which some employers were prejudiced against members of a minority group. Employers

maximize a utility function that is the sum of profits plus the monetary value of utility from employing members of particular groups.[5] This imperfect information can be damaging to minority groups and can potentially create unequal treatment, and in this case, different likelihoods of receiving a pension.

Becker uses his theory of employer discrimination systematically in a long run scale. The model emphasizes the differences in profits earned by discriminating employers and non-discriminating employers. His model shows that in the long run, workers that are discriminated against eventually do not need to work for discriminating employers due to the competitive advantage of non-discriminating employers. Non-discriminating employers earn more profits compared to discriminating employers by paying less for their labor and hiring minority workers. This in theory eliminates the wage gap, however, in fact a persistent wage gap between whites and minorities still remains. Moreover, this extends into the theoretical framework of this analysis by suggesting that the difference in pension benefits received is more heavily dependent on human capital differences between blacks and whites. Based on Becker's theory, I expect to find the black parameter estimate insignificant showing no evidence of labor market discrimination.

H: This study hypothesizes that there will no longer be discrimination between blacks and whites when receiving a pension benefit based on Gary Becker's theory of employer discrimination.

$\quad$: β for Black = 0

$\quad$: β for Black $\neq$ 0

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[5] Source: Altonji & Blank (1999)

IV.   <u>Data</u>

For this study, I used the 1979 cohort of the National Longitudinal Survey of Youth (NLSY79) in the year 2010. The NLSY79 is a panel study of a sample of 12686 young men and women who were 14-22 years old when they were first interviewed in 1979. Since then, they have been re-interviewed yearly from 1979 to 1994, and bi-annually since 1996. The NLSY79 documents each respondent's experience, mainly with the labor market such as labor market attachment, training and education.

To perform this analysis, the NLSY79 is used to analyze racial differences and control for various labor market characteristic. These identify variables that *increase* the probability of receiving a pension benefit except for some industry variables that could have either positive or negative coefficients associated. The variables used are similar to those in Even and Macpherson (1994), who use CPS data in their analysis. The purpose of these variables is to control for human capital and occupational differences between blacks and whites. These specific variables used are essential in building explanatory power of various experience, length and type of employment, income received, and educational attainments an individual would receive throughout the career of said individual. The goal for the data is to include as many educational and employment characteristics possible that would improve the likelihood of receiving a pension benefit as well as race dummy variables. The number of observations in the year 2010 is 1,081 as shown in the descriptive statistics.[6]

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[6] See Appendix table (1): Descriptive Statistics

V.   Empirical Model

To test Becker's theory of employer discrimination, I use a linear probability model to determine the probability of each race to receive a pension benefit. Even and Macpherson (1994), use a probability model that measures pension coverage between genders. As stated, this variable in the CPS data measures coverage rates versus in the NLSY79 measure offered or receiving rates. Running the logit model (QLIM) is essential for finding the economically significant parameter estimates as well as reporting a positive or negative correlation but is not essential for interpretation of results. To interpret these results, the procedure then accounts for running marginal effects which takes the average of the means of each parameter to find the probability of receiving a pension. After running the logit regression with marginal effects we can then interpret the results and determine probabilities of each variable. The dependent variable "Benefits," is a dummy variable asking if your employer made available to you a retirement plan other than social security. This variable is composed of "Yes" = 1 and "No" = 0 which is a binary dependent variable and can model probability as a linear function of X. Logit regression models the probability of Y=1 as the cumulative standard logistic distribution function, evaluated at $Z = \quad + \quad X$. The logit model is as follows: $Pr(Y = 1 \mid X) = F(\quad + \quad X)$, which is a function of:

Probability (Benefits = 1) = α +   Race +   Gender +   Hours +   Class +   Industry +
     Employees +   Union +   Wages +   Tenure +   Region +   HGComplete +
ε

Description of the variables is as follows as stated in the NLSY79, as well as the descriptive statistics shown in table (1):

The dependent variable "Fringe Benefits," as described in the NLSY79 states, "Did your employer make available to you a retirement plan other than social security?" In addition, this indicates a pension plan since a pension is a regular payment made during a person's retirement from an investment fund to which that person or their employer has contributed. Anything other than social security, would represent these characteristics as a plan provided by your employer. There is also a conceptual question to ask whether being 'offered' a pension is a better measurement than a 'coverage' pension rate. Being offered a pension may be a better measurement in terms of endogenous reasons, such as already being covered by a different plan. Using the 'coverage' rate would understate the true level of receiving a pension benefit since this measures only coverage of benefits offered and excludes being offered a plan. Thus, a 'coverage' dependent measurement would be better to use when comparing persons who strictly have a pension benefit offered through their employer. For this reason, the 'offered' pension variable is a better measurement for this particular analysis on probability of receiving a pension benefit between blacks and whites.

Race is divided into three categories: Hispanic equaling 1, Black equaling 2, and non-black, non-Hispanic equaling 3. For this study, Hispanics were deleted from the data set to measure only blacks and whites respectively. It is expected, based from Becker's theory, to find the Black coefficient to be insignificant.

Gender: Dummy variable created for males and referenced group females. It is also expected for males to show no significance based on Becker's theory.

Hours: represents hours per week worked. "How many hours per week do/did you usually work at this job/current assignment or on-call job/business?" This data ranges from 0 to 50 plus hours worked. The coefficient would be expected to be positive given that having fulltime status or working more hours would potentially increase the probability of having more benefits offered including pensions.

Class of worker: "Thinking of your current or most recent assignment, are/were you employed by government, by a private company, or a non-profit organization or are/were you self employed or working in a family business?" To keep consistency with Even and Macpherson (1994) study, I kept only government and private sector employment and deleted the rest of the observations. I would expect to have both government and private sector employment to show positive coefficients and also expect government to have higher probability in comparison to private sector.

Industry: is comprised into fifteen different businesses or industries and is expected to have either positive or negative coefficients associated.[7] The reference group used for industry is public administration and active duty military. The remaining industry variables will be used in reference to this variable in comparison. Different industries may either increase or decrease your probability of having a pension offered to you.

Employees: "At the place where you work/worked, how many employees does/did the employer have?" The data ranges from 1 to over 500 employees. The variable was then logged due to the lack of a linear relationship. Being employed with more employees is expected to increase the probability of receiving a pension.

Union: "On this job/current assignment or on-call job/business, are/were you a member of a labor union or of an employee association similar to a union?" Being a member of a union would increase the probability of receiving a pension since union employment on average receives higher wages and more benefits compared to non-union employment.

Wages: (Total income from wages and salary in past calendar year) "How much did you receive from wages, salary, commissions, or tips from all (other) jobs, before deductions for taxes or anything else?" Data ranges from 0 to 50,000 and above wages. The data was also logged due to the lack of a linear relationship. The variable wages was also decomposed into the log of hourly wages by multiplying hours worked per week by fifty-two weeks in a year then

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[7] See appendix table (2)

divided by total wages earned during the year. Increasing your wages would be expected to have a higher probability of receiving a pension.

Tenure: Total tenure in weeks with employer as of interview date job number one. The data was then divided by 52 to put in years. Tenure should have a positive coefficient given that increasing tenure results in an increased probability of receiving a pension.

Region: Region of current residence is divided into northeast, north central, south, and west. South was used as a reference variable. It is expected that region is insignificant in determining probability of a pension based on Even and Macpherson (1994).

Highest Grade Completed: As stated, the highest grade completed ranging from no education to eight years of college or more. Increasing your educational completion is expected to increase your probability of receiving a pension.

VI.   Data Analysis & Results

According to the results shown in table (2), the black dummy variable black was not significant stating that race had no effect on receiving a pension benefit. This, however, does state that the black variable is economically significant in the sense that is consistent with the hypothesis.

Significant industry variables include manufacturing, which is significant at the 99 percent level. The marginal effects show that manufacturing employment has nearly a 12 percent higher probability of receiving a pension when compared to public administration and active duty military. Wholesale trade showed significance at the 99 percent level showing the highest probability amongst the industry variables. Employment in wholesale trade has nearly a 19 percent higher probability compared to the reference group. Retail trade showed significance at the 95 percent level having a 10 percent higher probability compared to the reference group.

Lastly, finance and insurance also showed significance at the 95 percent level. This industry shows a 13 percent higher probability of receiving a pension compared to the reference group.

Wages was highly significant at the 99 percent level. The results show that a 1 percent increase in wages results in 9 percent increase in the probability of receiving a pension benefit.

Education or highest grade completed shows significance at the 95 percent level. This is defined by increasing education by one grade results in a 1.05 percent increase in the probability of receiving a pension benefit. Furthermore, when comparing a high school graduate to an individual who has eight or more years of college education, the data suggests that the college graduate has an 8.5 percent higher probability of receiving a pension.

Public sector employment proved to have significance at the 99 percent level. This explains that being employed in the public sector has a 17 percent higher probability of receiving a pension benefit when compared to the reference group of private sector employment.

The log of employees resulted in significance at the 99 percent level. By increasing the number of employees that are currently working by one employee, the probability of receiving a pension benefit increases by 5.12 percent. Tenure also showed significance at the 99 percent level. By increasing tenure by one year results in a .95 percent increase of receiving a pension benefit.

The results held consistency with the expected signs except for being in a labor union which was not statistically or economically significant. Being a male versus female did not affect the probability of receiving a pension as well as the regional dummy variables as predicted. Industry variables that were not significant include agriculture, mining, utilities, construction, transport and warehousing, information, real estate, professional scientific, technology, management, administrative, educational services, healthcare, arts, entertainment, and recreational. It was surprising to find that some of the industry variables were not significant. Educational services, health care, management and administrative, scientific, professional, and

information. All of these industries require high amounts of education, which the data suggests that education is significant and positive in the probability of receiving a pension. It was surprising to find that employment in a labor union had no such effect on receiving a pension. Labor unions are notorious for having, on average, higher salaries and more benefits offered. Union workers in 2009 are 53.9 percent more likely to have employer-provided pensions compared to non-union workers.[8] This could be due to multicollinearity with other variables.

To solve this, I omitted many different variables and ran the logit model with marginal effects again. By omitting lnWages, I was able to secure union employment significant at the 90 percent level. Employment in a union results in a 5 percent increase in probability of receiving a pension when compared to non-union employment. Industry variables that changed significance included both information and professional, scientific, and technology industries. Information was significant at the 90 percent level. Employment in information industry results in a 16.3 percent higher probability of receiving a pension benefit compared to the reference group. Professional, scientific, and technology was significant at the 99 percent level which shows a 14.3 percent higher probability of receiving a pension compared to the reference group. All significance levels stayed relatively the same for other variables as well as coefficients.[9]

VII.   Conclusion

This paper has documented that the probability of receiving a pension benefit is not affected by whether an individual is black or white. Based on the results, the probability of receiving a pension is highly determined by various human capital differences. Receiving a pension benefit is affected by the type of industry and class of occupation, income, education,

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[8] Source: "The Union Advantage: Facts and Figures." *Service Employees International Union, CTW, CLC*. N.p., n.d. Web. 8 May 2013. <http://www.seiu.org/a/ourunion/research/union-advantage-facts-and-figures.php>.
[9] See appendix table (3)

amount of employees employed, union employment, and tenure of employment. Receiving a pension is not affected by the region that an individual lives or whether an individual works in a labor union. The insignificance in region makes sense to suggest that probability of pensions received is not a regional phenomenon.

Gary Becker's theory of employer discrimination holds true in regards to non-discriminating firms hiring minority workers and increasing profits to force discriminating firms out of the market or to force discriminating firms to hire minority workers. This would imply that non-discriminating firms would not hold prejudice against offering pension benefits to different racial workers. Since these discriminating firms, in theory, have been eliminated from the labor market, there would be no findings empirically to suggest labor market discrimination between black and white workers. The results do highlight, however, various human capital differences that can increase the probability of receiving this benefit from your employer. Thus, we fail to reject the null hypothesis of having no discrimination of receiving a pension benefit between blacks and whites.

VIII.   Limitations and Suggestions for Future Work

The limitations for this study include the following:

1. Data from the year 2010 is the latest year available in the NLSY79 for the specific data measured, however, is limited in the scope in observations used. A future study on this topic should measure multiple years in different decades to test for consistency. Additionally, a data selection of pre 1974 would test the effectiveness of the ERISA legislation as mentioned in the introduction. NLSY79 data does not measure pre 1974.

2. Although the dependent variable 'benefits' is the only measurement of pensions to date in the NLSY79, it is worth noting as a limitation. Data that measures pension income could

give better understanding the pension gap between blacks and whites rather than being offered a pension.

3. Even and Macpherson's reference to employee turn-over is not controlled for in this analysis given that data was only used for the individual job number one. If there is a significant difference in employee turnover rates between blacks and whites, this could give better insight to the analysis.

4. This study focused on employer discrimination based off of Becker's model of discrimination; however, this could have also been modeled as employee discrimination in the sense of segregation in and out of different industries.

IX. <u>References</u>

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X.   Appendixes

Table (1) Descriptions and Summary Statistics; NLSY79 Data[10]

Variable	Description	Mean	Minimum	Maximum
RACE	Race of Recipient	2.666975	2	3
GENDER	Sex of Recipient	1.528215	1	2
HOURS	Hours worked per week	42.12858	5	112
CLASS	Employed by Government or private?	1.742831	1	2
INDUSTRY	Type of business or Industry	6164.86	170	9890
EMPLOYEES	# of employees at location or R's job #1	965.3164	1	99995
BENEFITS	Did your employer make available to you a retirement plan other than social security?	0.770583	0	1
UNION	Member of a labor union?	0.170213	0	1
WAGES	Total Income from wages and salary in past calandar year	50923.85	300	312324
TENURE	Total tenure in years	7.478154	0.0192308	32.8653846
REGION	Region of current Residence	2.597595	1	4
HGCOMPLETE	Highest Grade Completed	13.92692	7	20
HOURLYWAGE	Wages/(Hours*52)	22.68559	1.0086538	133.4717949
MALE	Dummy for Male	0.471785	0	1
BLACK	Dummy for Black	0.333025	0	1
WHITE	Dummy for White	0.666975	0	1
PUBLIC	Dummy for Public Sector	0.257169	0	1
PRIVATE	Dummy for Private Sector	0.742831	0	1
NE	Dummy for North East	0.152636	0	1
NC	Dummy for North Central	0.240518	0	1
South	Dummy for South	0.46346	0	1
West	Dummy for West	0.143386	0	1
lnwages	log of Wages	2.81615	0.0086166	4.8938902
lnEmployees	log of Employees	4.316145	0	11.51287

[10] Data from: "The NLSY79." *Bureau of Labor Statistics*. N.p.. Web. 11 Feb 2013.
<http://www.bls.gov/nls/handbook/2005/nlshc3.pdf>.

Table (2) QLIM and Marginal Effects Results

Variable	Parameter	Approx Pr>|t|	Marginal Effect
Constant	-5.176	<.0001	
Agriculture	-2.076	0.1938	-0.2361
Mining	-0.747	0.4720	-0.0850
Utilities	0.367	0.7468	0.0418
Construction	0.152	0.7147	0.0173
Manufacturing	1.031***	0.0080	0.1173
Wholesale Trade	1.661***	0.0100	0.1889
Retail Trade	0.877**	0.0160	0.0998
Transport & Warehousing	0.215	0.6323	0.0245
Information	1.029	0.1515	0.1171
Finance and Insurance	1.127**	0.0436	0.1281
Real Estate, Rental, Leasing	0.853	0.2180	0.0970
Professional, Scientific, Tech	0.824	0.0723	0.0937
Management, Administrative	0.455	0.3048	0.0517
Educational Services	0.316	0.5265	0.0360
Health Care, Social Assistance	0.353	0.3436	0.0402
Arts, Entertainment, Rec.	-0.925	0.1220	-0.1052
NE	-0.152	0.5919	-0.0173
NC	0.323	0.1846	0.0367
West	0.062	0.8250	0.0071
lnWages	0.791***	<.0001	0.0900
HGComplete	0.093**	0.0476	0.0105
Public	1.492***	<.0001	0.1697
lnEmployees	0.45***	<.0001	0.0512
Tenure	0.836***	<.0001	0.0095
Union	0.449	0.1860	0.0511
Male	0.028	0.8905	0.0033
Black	0.187	0.3825	0.0213
***p<.001;	**p<.05;	*p<.01	
99	95	90	

Table (3) QLIM and Marginal Effects Results

(Omitting lnWages)

Variable	Parameter	Approx Pr> |t|	Marginal Effect
Constant	-4.504	<.0001	
Agriculture	-2.699	0.0647	0.3256
Mining	-0.538	0.623	-0.0649
Utilities	0.732	0.5129	0.0883
Construction	0.311	0.4425	0.0375
Manufacturing	1.113***	0.0033	0.0878
Wholesale Trade	1.912***	0.0025	0.1569
Retail Trade	0.827**	0.0174	0.0676
Transport & Warehousing	0.370	0.4083	0.0446
Information	1.357*	0.0538	0.1637
Finance and Insurance	1.496***	0.007	0.0898
Real Estate, Rental, Leasing	0.868	0.1848	0.1047
Professional, Scientific, Tech	1.185***	0.0065	0.1430
Management, Administrative	0.359	0.3972	0.0433
Educational Services	0.294	0.5517	0.0354
Health Care, Social Assistance	0.556	0.1312	0.0671
Arts, Entertainment, Rec.	-0.878	0.1371	-0.1059
NE	-0.164	0.5463	-0.0160
NC	0.324	0.1691	0.0366
West	0.106	0.7051	0.0029
HGComplete	0.169***	<.0001	0.0127
Public	1.617***	<.0001	0.1467
lnEmployees	0.465***	<.0001	0.0518
Tenure	0.104***	<.0001	0.0097
Union	0.591*	0.0822	0.0489
Male	0.287	0.1485	-0.0084
Black	-0.010	0.9602	0.0163
***p<.001;	**p<.05;	*p<.01	
99	95	90	

XI. SAS Code

```
DATA NEW_DATA2; /*new*/
SET NEW_DATA1; /*old*/
infile 'C:\Users\jmg106\Desktop\default4\default4.dat' lrecl=61 missover DSD
DLM=' ' print;
input
  R0000100
  R0214700
  R0214800
  T2302300
  T2312300
  T2326000
  T2326500
  T2403600
  T2413104
  T2450100
  T3045300
  T3106400
  T3108200
  T3108600
;
array nvarlist _numeric_;



RENAME
  R0000100 = 'CASEID_1979'n
  R0214700 = 'RACE'n
  R0214800 = 'GENDER'n
  T2302300 = 'HOURS'n
  T2312300 = 'CLASS'n
  T2326000 = 'INDUSTRY'n
  T2326500 = 'OCCUPATION'n
  T2403600 = 'EMPLOYEES'n
  T2413104 = 'BENEFITS'n
  T2450100 = 'UNION'n
  T3045300 = 'WAGES'n
  T3106400 = 'TENURE'n
  T3108200 = 'REGION'n
  T3108600 = 'HGCOMPLETE'n
  ;

  label R0000100 = "ID# (1-12686) 79";
  label R0214700 = "RACE";
  label R0214800 = "GENDER";
  label T2302300 = "HOURS";
  label T2312300 = "CLASS";
  label T2326000 = "INDUSTRY";
  label T2326500 = "OCCUPATION";
  label T2403600 = "EMPLOYEES";
  label T2413104 = "BENEFITS";
  label T2450100 = "UNION";
  label T3045300 = "WAGES";
  label T3106400 = "TENURE";
  label T3108200 = "REGION";
  label T3108600 = "HGCOMPLETE";
;
RUN;
```

```
DATA NEW_DATA3;
SET NEW_DATA2;


IF BENEFITS<0 THEN DELETE;
IF OCCUPATION<0 THEN DELETE;
IF INDUSTRY<0 THEN DELETE;
IF HOURS<0 THEN DELETE;


HOURLYWAGE = WAGES/(HOURS * 52);
IF HOURLYWAGE<1 THEN DELETE;
IF HOURLYWAGE>150 THEN DELETE;

MALE = 0;
IF GENDER = 1 THEN MALE = 1;

/*HISPANIC = 0;
IF RACE = 1 THEN HISPANIC = 1;*/
BLACK = 0;
IF RACE = 2 THEN BLACK = 1;
WHITE = 0;
IF RACE = 3 THEN WHITE = 1;
IF RACE = 1 THEN DELETE;

IF CLASS<0 THEN DELETE;
IF EMPLOYEES<0 THEN DELETE;
IF UNION<0 THEN DELETE;
IF TENURE<0 THEN DELETE;
TENURE = TENURE/52;

PUBLIC = 0;
IF CLASS = 1 THEN PUBLIC = 1;
PRIVATE =0;
IF CLASS = 2 THEN PRIVATE = 1;
IF CLASS>2 THEN DELETE;

IF REGION=1 then NE=1; ELSE NE = 0;
IF REGION=2 then NC=1; ELSE NC = 0;
IF REGION=3 then South=1; ELSE South = 0;
IF REGION=4 then West=1; ELSE West = 0;
IF REGION <1 THEN DELETE ;

lnwages = log(HOURLYWAGE);
lnEMPLOYEES = log(EMPLOYEES);

INDUSTRY0 = 0;
IF 170<=INDUSTRY<=290 THEN INDUSTRY0 = 1;
INDUSTRY1 = 0;
IF 370<=INDUSTRY<=490 THEN INDUSTRY1 = 1;
INDUSTRY2 = 0;
IF 570<=INDUSTRY<=690 THEN INDUSTRY2 = 1;
INDUSTRY3 = 0;
IF INDUSTRY = 770 THEN INDUSTRY3 = 1;
INDUSTRY4 = 0;
IF 1070<=INDUSTRY<=3990 THEN INDUSTRY4 = 1;
INDUSTRY5 = 0;
IF 4070<=INDUSTRY<=4590 THEN INDUSTRY5 = 1;
INDUSTRY6 = 0;
IF 4670<=INDUSTRY<=5790 THEN INDUSTRY6 = 1;
INDUSTRY7 = 0;
IF 6070<=INDUSTRY<=6390 THEN INDUSTRY7 = 1;
INDUSTRY8 = 0;
```

```
IF 6470<=INDUSTRY<=6780 THEN INDUSTRY8 = 1;
INDUSTRY9 = 0;
IF 6870<=INDUSTRY<=6990 THEN INDUSTRY9 = 1;
INDUSTRY10 = 0;
IF 7070<=INDUSTRY<=7190 THEN INDUSTRY10 = 1;
INDUSTRY11 = 0;
IF 7270<=INDUSTRY<=7490 THEN INDUSTRY11 = 1;
INDUSTRY12 = 0;
IF 7570<=INDUSTRY<=7790 THEN INDUSTRY12 = 1;
INDUSTRY13 = 0;
IF 7860<=INDUSTRY<=7890 THEN INDUSTRY13 = 1;
INDUSTRY14 = 0;
IF 7970<=INDUSTRY<=8470 THEN INDUSTRY14 = 1;
INDUSTRY15 = 0;
IF 8560<=INDUSTRY<=8590 THEN INDUSTRY15 = 1;
INDUSTRY16 = 0;
IF 8660<=INDUSTRY<=8690 THEN INDUSTRY16 = 1;
INDUSTRY17 = 0;
IF 8770<=INDUSTRY<=9290 THEN INDUSTRY17 = 1;
INDUSTRY18 = 0;
IF 9370<=INDUSTRY<=9870 THEN INDUSTRY18 = 1;
INDUSTRY19 = 0;
IF INDUSTRY = 9890 THEN INDUSTRY19 = 1;
IF INDUSTRY>9950 THEN DELETE;
/* take log of wage*/



/*EMPLOYEES = EMPLOYEES/10;*/


drop R0000100;
drop R0214700;
drop R0214800;
drop T2302300;
drop T2312300;
drop T2326000;
drop T2326500;
drop T2403600;
drop T2413104;
drop T2450100;
drop T3045300;
drop T3106400;
drop T3108200;
drop T3108600;



run;

proc means;
run;


proc qlim;
title model#1;
model BENEFITS = NE NC WEST LNWAGES HGCOMPLETE PUBLIC lnEMPLOYEES TENURE
UNION MALE BLACK/discrete(d=logit);
RUN;
```

```
proc qlim;
title MAREFF;
model BENEFITS = INDUSTRY0-INDUSTRY15 NE NC WEST LNWAGES HGCOMPLETE
PUBLIC lnEMPLOYEES TENURE UNION MALE BLACK/discrete(d=logit);
output out=outqlim marginal;
RUN;

proc means data=outqlim n mean;
var Meff_P2_INDUSTRY0-Meff_P2_INDUSTRY15 Meff_P2_NE Meff_P2_NC
Meff_P2_WEST Meff_P2_LNWAGES Meff_P2_HGCOMPLETE Meff_P2_PUBLIC
Meff_P2_lnEMPLOYEES
Meff_P2_TENURE Meff_P2_UNION Meff_P2_MALE Meff_P2_BLACK;
title 'Average of the Individual Marginal Effects';
run;
```