The Inequality of Medical Insurance Among Races in the U.S.

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Introduction

During 2020, under the COVID crisis Black Americans were dying at twice the rate of white Americans, and this terrifying fact led to the topic: There is inequality of medical insurance among races in the U.S. This research will study two majority of the population in the U.S which are White and Black, with white people taking up to 60.1% and blacks 13.4% of the total population. Unlike Canada, where everyone buys their own insurance through MPS, which is the medical service that is affordable for every citizen, the majority of the people in the U.S. do not buy health insurance on their own; most people get their insurance covered from work. "According to a 2017 Kaiser Family Foundation (KFF) survey, 49% of the U.S. population gets their insurance from the company they work for, and only 7% of the population buys their own health insurance." I obtained the data from National Longitudinal Study of Adolescent to Adult Health (Add Health), 1994-2008. The Add Health survey was followed into young adulthood with four waves, each wave is taken in different age stage and the most recent one is conducted in 2008 when the sample was aged around 24-32. I chose the latest interview - Add Health waves 4 to be my data source since the age between 24-32 is the range that people most likely have their own insurance.

The methodology involved in this study leans in on observing how each independent variable's effect on probability of insurance covered the OLS multiple linear regression model is utilized. Following this, the Probit method is used to obtain more accurate result. With the information regarding Race, Supervised, Fired Number, Age, and Smoker gathered, a table depicting the OLS Regression, and the Probit Regression statistics are placed side by side, allowing for a means of comparison. Results show that the generally and quite predictably, white Americans are more likely to get sufficient health insurance in comparison to black Americans.

The precise reason for this primarily lie within class factors, but family background, education, along with lifestyle also contribute greatly to whether or not the company that the Americans are working for are willing to provide their workers with the health insurance that they should rightfully have. Needless to say, the financial discrepancy between black and white Americans is the main reason as to why the latter receive far better benefits in health insurance. Following this, measures will be used to describe which model is better suited to explain the methodology of this research in particular.

Ultimately, the results showcase that there is indeed an inequality in health insurance for the U.S. White Americans in contrast are more likely to obtain the benefits provided by the country, but this does not mean it is impossible for black Americans to get the same opportunities. The difference is that blacks must work hard to improve their living standards in order to obtain the same benefits as the white Americans.

Data source

From National Longitudinal Study of Adolescent to Adult Health (Add Health), 1994-2008, waves 4 my Dependent variable: H4HS1 question: Which of the following best describes your current health insurance situation? This variable contains 11 groups. Our main analysis is whether health insurance is covered by work, therefore I will be using level 1 and level 2. Main Effect X1: race H41R4, question: Indicate the race of the sample member/respondent from your own observation (not from what the respondent said). There are 4 groups in this variable: White/ Black/Asian/American Indian. Here, our main focus is White and Black people. There are also 4 control variables. X2: Thinking about your official job duties, which of the following statements

best describes your supervisory responsibilities at your (current/most recent) primary job? Here, we can see the position of the respondent (management or nonmanagement staff). X3: Thinking back over the period from 2001 to the previous year, how many times have you been fired, let go or laid off from a job? From this we can see whether the respondent is having a stable career or not. We can also obtain the respondent's working attitude from this variable. X4: Respondent's date of birth – Year. I will use this to replace age, and here, calculation is required; the year of the survey was taken in 2008, and so we can let 2008 minus the birth year to get the exact age of every respondent. X5: H4TO3, have you ever smoked cigarettes regularly—that is, at least one cigarette every day for 30 days, through this question we can see whether the respondent has smoking habit. The reason I chose these control variables is because X2-X4 are related to income, and X5 is related to insurance.

Descriptive statistic table of each variables

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Insurance	3510	0.7145	0.4517	0	1
race	3510	0.7430	0.4370	0	1
Supervised	3510	0.3778	0.4849	0	1
The number of fired	3510	0.5512	1.5015	0	50
Age	3510	29.0071	1.7717	25	34
Smoke	3510	0.4532	0.4979	0	1

Table 1: The summary statistic table for all variables and all observations.

The table shows there are 3510 observations in my dataset. The mean of insurance is 0.7145 this actively demonstrates that 71.45% of observations who was covered insurance by work. The mean of race is 0,7430 which is 74.3% of observations who are white people in the sample data.

The mean of supervised that is 37.78% of observations who supervise others in the work. The mean of fired number per person is 0.5512 in the sample but largest value is 50 times to be fired. The mean age of observations is 29 years old. The mean of smoke is 0.4532 which is 45.32% of observations who is smoker.

For White race					
Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Insurance	2608	0.7197	0.4492	0	1
Supervised	2608	0.3911	0.4881	0	1
The number of fired	2608	0.4988	1.2980	0	29
For Black race					
Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Insurance	902	0.6796	0.4669	0	1
Supervised	902	0.3259	0.4690	0	1
The number of fired	902	0.7373	2.0349	0	50

Table 2: The summary statistic table for Insurance, Supervised and number fired variables in white and black race

When comparing the two tables, we can clearly discover that whether in the Insurance or the supervised values, white people have a larger proportion. On the other hand, under the "number of fired" column black people have a higher proportion against whites, the maximum of 50 times.

Literature Review

Medicaid expansion and ethnoracial disparities in health insurance coverage

Flores and Vargas' (2017) study on "Medicaid expansion and ethnoracial disparities in health insurance coverage" discusses the black-white disparities in health insurance coverage. More specifically, it provides information about the policy expansion of Medicaid, a part of the Patient Protection and Affordable Care Act (PPACA)—also known as the data source—in the

U.S., and how they are not entirely decreasing in the ethnoracial health insurance disparities. That said, Medicaid's expansion's connection with ethnoracial disparities in health insurance coverage is highlighted within the study's focus on minority communities. Since my research focuses on health insurance inequality specifically in the black versus white area, this research will provide me with sufficient data regarding the topic. The method used is the panel data regressions between the gap in health insurance of non-Hispanic whites and blacks, which is precisely the information my research requires. Ultimately, the study concludes that the Medicaid expansion policy did not contribute to narrowing the gap between black and white disparities in health insurance coverage. What it did discover, however, is that according to health insurance through state or federal exchange, there could be a difference in said disparity. The strength in this research article comes from not only does it focus on white versus black, but they also provide information on other minorities, such as Asians and Hispanics, thereby providing me information for greater contrast when necessary. Consequently, however, this is also one of its weaknesses, as it also focuses on other races, and therefore my approach to black versus white may be hindered.

Understanding Health Disparities Across Education Groups

The article "Understanding Health Disparities Across Education Groups" by Dana Goldman and Darius Lakdawalla (2001) is structured in five studies which can provide aid to investigate the relationship between my independent variables and the dependent variable. This section starts by delving into how health disparities function across education groups, emphasizing that with higher education status, it is more likely for individuals to have better health insurances. Goldman and Lakdawalla (2001) examine the relationship between education

and health and compiled a theory where health disparities in fact increase as the price of health inputs falls. Therefore, government subsidies for healthcare might worsen health inequality. The Framingham Heart Study (FHS) shows that with the emergence of drugs, there is a dramatic reduction in disparities within hypertension and hypertensive diseases in a period of several years, which coincides with how with better access to healthcare, one is able to create a sense of longevity in health. The author used OLS multiple linear regression measured of health, death, and education, age, and sex. Based on these statistics, the author analyzed how health disparities relating to technologies and shocks to health coincide with the aforementioned subjects. Consequently, these factors are capable of affecting the inequality of medical insurance amongst races in the U.S. When the technologies improve, healthcare price goes down, encouraging the wealthy to invest more. However, with the demands going up, as will the price, leading to further disparities. Ultimately, the strengths of this article are that it encompasses topics revolving around technology; on the other hand, its weaknesses lie within how there are too many topics being covered, and therefore the details are lacking.

Trends in the Black-White Life Expectancy Gap Among U.S. States, 1990-2009

The article "Trends in the Black-White Life Expectancy Gap Among U.S. States, 1990-2009" by Harper, MacLehose, and Kaufman (2014) explores the trends in the black-white life expectancy gap among U.S. states. The authors used the data source National Center for Health Statistics (NCHS) from a broader range of years, namely, from 1990-2009, to estimate inequalities in life expectancy at birth between black and whites for all 50 states and including District of Columbia. The research is meticulous in that there are estimates that distinguish males and females separately since the changes in black and white gap may be different. The Bayesian

smoothing methods is used in this research, and it stabilized rates and allowed the calculation of 95 percent credible interval estimates. The data source for this study is National Vital Statistics System and the Poisson regression, which are now maintained by the aforementioned NCHS, and they extracted the data using software from the National Cancer Institute's Surveillance, Epidemiology and End Results Program. To calculate life expectancies, they modeled the mortality in each state-age-sex-race category in each year, with the size of each group as an offset term in the regression. The weakness from this article is that the authors have failed to restrict non-Hispanics due to data reliability, and so the result may not mention non-Hispanic populations. However, the strength within this article lies in the fact that it provides much information regarding the reasons for the life expectancy differences between races. This subject in particular is important, as I am focusing on the inequality of health insurance among races, and since most deaths regarding black people is caused by the lack of health care, this article will reinforce my argument.

Black-White Achievement Gap and Family Wealth

The article "Black-White Achievement Gap and Family Wealth" by W. Jean Yeung and Dalton Conley (2008) examines to what extent family wealth can affect Black and White test scores for children. The authors utilized the Panel Study of Income Dynamics, which mainly focuses on ages 3 to 12. While very little evidence show that wealth can deviate score gaps, it is apparent that demographic, the quality of home environment, along with parenting ultimately affect a child's development overall. In this sense, when a family is lacking in those areas, it is natural for a child to have a disadvantage in thriving in education. That said, the article provides sufficient statistics to showcase the mean score between white and black families regarding areas

such as family income, wealth measures, liquid assets, value of debts, and etcetera. With financial data provided between the two races, it can help further indicate the inequality of healthcare access. The study provides a regression-based analysis between family wealth and children's test scores. Firstly, race is analyzed, followed by race and controls for a family socioeconomic status, parental wealth measures, and finally, mediators. The strength that is evident in this article is the sufficient data provided regarding family backgrounds, the statistics that depict the values between each race, and ultimately, analyses that delve into the likelihood behind such factors. The weakness, however, lies within the fact that the sample size is much too small. With only around 2,000 subjects, it is difficult to determine whether or not the results can be applicable to the whole of America.

The Impact of economic Freedom on the Black/White Income Gap

Hoover, Compton, and Giedeman's (2015) study on "The Impact of economic Freedom on the Black/White Income Gap" highlights the racial gap found in incomes between blacks and whites in the U.S., and how economic freedom can affect black household income versus white household income, along with the obvious income gap that follows. As the article provides evidence on how blacks have increasingly lagged behind whites in financial status, it also gives reasons as to why such a phenomenon has happened; factors such as racial discrimination are explored, but the main reasoning is ultimately the large mean income differentials by race. That said, by understanding the discrepancies between the two races, my topic of inequalities regarding healthcare can further be analyzed. In terms of the method, the empirical approach is based on a standard panel model. Furthermore, the log of black and white household real median income along with the ratio log of the two are considered. One weakness in this study is the fact

that when the authors argued racial discrimination may not be the major factor for the income differences, they have not considered income that may have been earned illegally—meaning, money that cannot be liquidated or is not taxed. The strength provided in this article is that the primary focus of defining the income ratio between black and white households is calculated meticulously, thereby providing sufficient statistics.

Methodology

In order to see how each independent variable's effect on probability of insurance covered the OLS multiple linear regression model is first being used. Here is the equation below and ε is an error term.

$$Insurance = \beta_0 + \beta_1 Race + \beta_2 Supervised + \beta_3 FiredNumber + \beta_4 Age + \beta_5 Smoker + \varepsilon$$

Secondly, I used the Probit method to get more accurate results, since my Y is a dummy variable.

$$P(Insurance = 1|Race, Supervised, FiredNumber, Age, Smoker) = \Phi(\beta_0 + \beta_1 + Race + \beta_2 Supervised + \beta_3 FiredNumber + \beta_4 Age + \beta_5 Smoker + \varepsilon)$$

Here is the population Probit model with multiple regressors: Race, Supervised, Fired Number, Age, Smoker and Φ is the cumulative standard normal distribution function.

For both model: β_0 represents the same age and 0-fired number, non-smoker, non-supervised and black race, the probability (proportion) of insurance covered by work is beta 0.

β_1 stands for the same age and fired number, same smoking status, same supervised or not, the difference of probability (proportion) of insurance covered between race (white vs. black)

β_2 stands for the same age, same fired number, same smoking status, black race, the difference of probability (proportion) of supervised or not.

β_3 stands for same age, same smoking status, black race, same supervised or not, the difference of probability (proportion) of fired number.

β_4 stands for same smoking status, black race, same fired number, same supervised or not, the difference of probability (proportion) of age.

β_5 stands for same age, same supervised or not, same fired number, black race, the difference of probability (proportion) of smoking status.

In 2016 from the examination of wealth in the U.S., the white family's net worth is $171,000 whereas the black family's net worth is $17,150. A ten times difference of the family net worth may cause black people to not be able to afford the same quality service as the white Americans. The problem in this lies within the fact that black workers are still earning less than their white counterparts (Miller). To be more precise, based on a survey conducted between 1.8 million employees in 2017 to 2019, black Americans earn 87 cents for every dollar earned by white men. Even for black men who have similar qualifications as white men, they earn 98 cents for every dollar earned by men of other races. Below are several factors that support my hypothesis and what is to be expected in this hypothesis.

Null hypothesis H0: There is no difference in health insurance among races (between white and black).

Alternative hypothesis H1: There is difference in health insurance among races.

Results

VARIABLES	OLS Regression	Probit Regression
Race	0.0586***	0.179***
	0.0173	0.0531
Supervised	0.0536***	0.175***
	0.0153	0.048
FiredNumber	-0.0432***	-0.112***
	0.00489	0.0139
Age	0.00920**	0.0289**
	0.00418	0.013
Smoke	-0.174***	-0.527***
	0.0151	0.0467
Constant	0.482***	-0.155
	0.122	0.379
Observations	3,510	3,510
R-squared	0.068	

Standard errors in parentheses
**** p<0.01, ** p<0.05, * p<0.1*

Table 3： The regression results table

Firstly, attention must be drawn to the OLS regression. On the basis of the model, when other X remains unchanged, it can be seen that the proportion of insurance covered of white people is 5.86% higher than black people, with the P-Value revealing less than 0.01. From here, it illustrates that there is an obvious otherness on the insurance coverage between white and black people. Furthermore, the supervisor's proportion of insurance is 5.36% higher than ordinary employees, with a P-Value also smaller than 0.01, which allows us to infer that whether the people are supervisors or not, it will have a significant effect on their insurance coverage. On the other hand, under the category Fired Number, it can be seen that it has a remarkable negative effect on the insurance's proportion, where each time a person gets fired, the marginal effect that their chance getting the insurance covered is down by 4.32%. Next, we find that age has a positive relation with getting insurance covered; the older you are the higher chance you can get

your insurance covered through work. Since the P-Value of age's coefficient is less than 0.05, it once again shows that age has a significant influence on insurance coverage. Finally, a similar result can be seen in the Smoke category, which is comparable to that of the Fired Number. To elaborate, as smoking has a negative relation with insurance coverage, people who smoke will subsequently have a smaller probability getting their insurance covered. Since 3,510 is a relatively large sample size and our Y is a dummy variable, the R-Square is comparatively small with a value of 0.068. Here, the results state that 6.8% sample variation of insurance covered is explained by this model.

Since my Y is a dummy variable plus to intensify my previous statement, I also used Probit regression to double check my results. From the model itself, the results are very similar to the OLS above. When X remains unchanged, the probability of insurance covered for white is 17.9% higher than black people and the P-value is less than 0.01. Again, it proves there is a significant difference between the white and black regarding the insurance cover. Whoever is a supervisor, their probability of getting their insurance covered is 17.5% higher than the employees, with the P-Value also being less than 0.01. Next, the same result can be seen with the OLS Fired number and Smoking, where both have a negative effect on the insurance cover. Under the Probit regression, the marginal effect of getting fired is much larger than the OLS results, where every time one gets fired, one would lose 11.2% of the probability to get their insurance covered. The more a person gets fired or the longer they smoke will result in them having a smaller chance to have their insurance covered. Moreover, age still has a positive relationship with insurance coverage, since the P-Value is less than 0.05, this actively demonstrates that increasing in age also increases the probability of getting the insurance covered.

From the Economics point of view, getting insurance covered can significantly affect the personal benefit, and reduce the living cost for one's budget constraint. In other words, with these benefits, people are naturally richer than those who do not have their insurance covered. On the other hand, from the insurance company's point of view, understandably, insurance firms are considered as investment corporations, where both the client and the firms play the "investor" character; therefore, the company's profit is the top priority. In the U.S., white people are the majority population, and this ties in with the data at hand where white people also have a larger proportion in "high earning" position in work – specifically, they are involved in less dangerous work thereby granting them safer positions. As such, the more they get their insurance, it means the more profit it will be for the provider. On the contrary, from the data table, it is evident that black people are more likely to get fired and thus, it reduces the probability for them to get a decent job. Subsequently, they may have to find a job that contains more risk, and this would mean that the insurance firms have a higher probability to compensate the client; equivalently they have less chance to have their insurance covered. Our results from the regression are consistent with the verdict as well. At the same time, under the pandemic situation of Covid-19, the number of black workers is low in the labour market. More specifically, if they seek out jobs that have insurance coverage, there is a higher chance that such a job will not provide them with a high enough pay; on the other hand, if they seek for a job that has decent pay, it is just as likely that they do not have proper insurance coverage. This also explains why many black people would willingly choose to take high-risk or dangerous jobs. Ultimately, this would also mean that there is less incentive for them to find a steady job.

Notably, most supervisors in the U.S. are white, showing that there is indeed a gap in the wage between white and black people. However, an important point in this is that wealth exceeds

beyond that of individuals—there is also the factor of family wealth. More specifically, when a person is of high ranking in a job, it is more likely for their family to get health insurance. On the other hand, if a person were of low position, it is less likely for them to get health insurance at all. Having said that, family wealth would then be an important factor when analyzing the access to health insurance overall. This point is supported by Yeung and Conley's (2008) article on "Black-White Achievement Gap and Family Wealth", where a family's socioeconomic status, parental wealth measures, and mediators contribute greatly to how wealthy an individual may turn out to become. Furthermore, Hoover et al.'s (2015) study on "The Impact of economic Freedom on the Black/White Income Gap" go on to highlight that there is a severe lack of economic freedom between the two, resulting in yet again another discrepancy in financial status. Such a phenomenon is undoubtedly a leading problem in the fact that health insurance is declared to be so unaffordable by much of the population in the U.S.

With the development of society over time, there would also be an advancement in technology. This would naturally mean that there should be an improvement in health insurance where the price would subsequently decrease. Despite this fact, statistics show that black people in the U.S. still struggle with health insurance issues. Goldman and Lakdawalla's article on health disparities discusses that the advancement of technology would reduce the cost for such a necessity. Their statement appears to be true, yet it nonetheless proves that the disparity of health disparity between white and black people in America is a reality.

Robustness

In terms of OLS regression model, there are 6 assumptions.

1. Linear in parameter
2. Sample randomly and each observation are independent
3. The conditional mean of independence is zero
4. There is no perfect collinearity
5. Homoskedasticity: the variance of error U is constant
6. Error term U is Normal distributed

Robustness check-assumption 4, 5, 6

Assumption 4: VIF check

Variable	VIF	1/VIF
race	**1.04**	**0.963634**
smoke	**1.03**	**0.966506**
fireNumber	**1.01**	**0.986990**
Supervised	**1.01**	**0.994238**
age	**1.00**	**0.999504**
Mean VIF	**1.02**	

In the table above, all independent variables have low VIF values, which means there is no perfect collinearity. That said, assumption 4 is met.

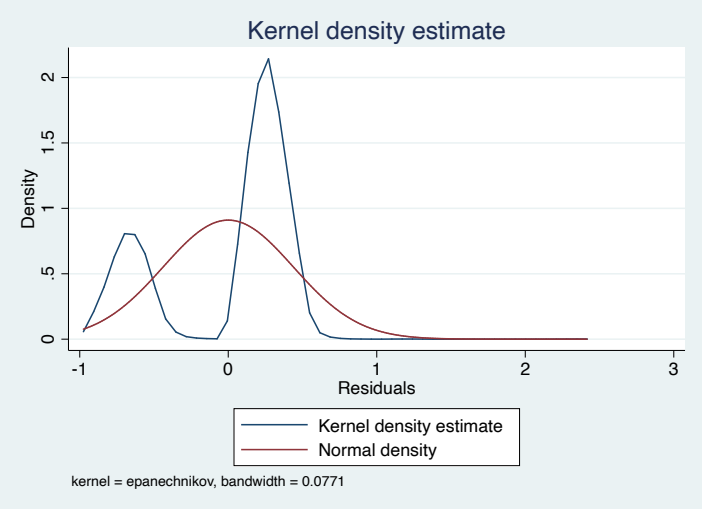
Assumption 5: Hettest Test

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of insurance

         chi2(1)      =   212.54
         Prob > chi2  =   0.0000
```

As the p-value is 0, there is sufficient evidence to show the variance of error U is heteroskedasticity. With that said, assumption 5 is not satisfied.

Assumption 6: kdensity to check



In the graph depicted above, the blue line represents the Kernel density estimate, whereas the red line represents the normal densit. Evidently, the estimate of error U cannot fit the red line of normal density very well, therefore the error U is not of normal distribution. Moreover, assumption 6 is not satisfied.

Ultimately, the Probit regression model is considered to be more appropriate than the OLS regression model for research study purposes.

Conclusion

Through the research analysis and the regression model conducted in this study, results show that there is a significant disparity between what is covered for U.S. black and white health insurances. In particular, whites are more likely to get insurance based on the variables studied in this research, and while this may seem bleak for the minorities of the U.S., it is shown that blacks can obtain the same opportunities so long as they have the wealth and fortune to make a change for themselves. The general consensus is that for all races, if they want to be provided with fairness at work, they must work to improve themselves. Within the different races in America, it is evident that a difference in income, family background, and education can impact the outcome of people's living standards. Despite the differences seen between races, however, it is ultimately important to see that we should all be treated equally in order to work together, allowing the world to improve as a whole.

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