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RACE DIFFERENCES IN LABOR FORCE ATTACHMENT AND DISABILITY STATUS

John Bound
Michael Schoenbaum
Timothy Waidmann

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ABSTRACT

We use the first wave of the Health and Retirement Survey to study the effect of health on the labor force activity of Black and White men and women in their 50s. The evidence we present confirms the notion that health is an extremely important determinant of early labor force exit. Our estimates suggest that health differences between Blacks and Whites can account for most of the racial gap in labor force attachment for men. For women, where participation rates are comparable, our estimates imply that Black women would be substantially more likely to work than White women were it not for the marked health differences. We also find for both men and women that poor health has a substantially larger effect on labor force behavior for Blacks. The evidence suggests that these differences result from Black/White differences in access to the resources necessary to retire.

John Bound
Population Studies Center
University of Michigan
1225 S. University Avenue
Ann Arbor, MI 48104
and NBER

Michael Schoenbaum
School of Public Health
University of California
140 Warren Hall
Berkeley, CA 94720-7360

Timothy Waidmann
Survey Research Center
University of Michigan
3255 Institute for Social Research
Ann Arbor, MI 48106-1248

INTRODUCTION

For most of the post-World War II period, the labor force participation rates of working-age Black men have been significantly lower than those of White men, and this gap has tended to widen as men age. While Black women have historically shown a greater attachment to the labor force than White women, this difference has tended to narrow or disappear as women enter their 40s and 50s. For both men and women, participation rates tend to drop faster among Blacks than among Whites as workers approach their 60s.

It seems plausible that health limitations on men's and women's capacities for work are important for understanding these patterns. Black men and women are substantially more likely to identify themselves as physically unable to work; in absolute terms, the fraction of all men and women reporting themselves unable to work rises with age, and the gap between Whites and Blacks increases dramatically with age. The differences in the proportion of older, working-age Black and White men identifying themselves as physically unable to work are of similar magnitude to the gap in male labor force participation between these groups and accounts for most of the difference in labor force participation rates (Hayward, Friedman, & Chen, 1996; Bound, Schoenbaum, & Waidmann, 1995). Similar calculations for women suggest that, were Black women in their 40s and 50s to experience work limitation rates similar to those of White women in these age ranges, they would continue to show a greater attachment to the work force.

The fact that more Blacks than Whites report that they are limited in their ability to work, or are unable to work at all, presumably reflects differences in health to a considerable extent. We know that the health of middle-aged Blacks is worse than that of middle-aged Whites and that this difference widens through middle age (Ries, 1990; House, et al., 1990; Geronimus, 1992). Blacks are approximately twice as likely as Whites to report suffering from diabetes, hypertension, and arthritis (Manton, Patrick, & Johnson, 1987; Schoenbaum and Waidmann, 1995), and clinical evidence suggests that, relative to Whites, Blacks have higher rates of undiagnosed diabetes and roughly the same rate of undiagnosed hypertension (Andersen, Mullner, & Cornelius, 1987). In addition, death rates are higher for Blacks at most ages and for nearly all causes.

At the same time, since disabilities reflect a gap between an individual's capacity and the demands of an activity (Pope and Tarlov, 1991), the difference in the fractions of Blacks and Whites identifying themselves as limited in their capacity to work could be due, in part, to differences in the nature of the jobs typically held by older Black and White adults, respectively. For instance, we know that Blacks tend to be disproportionately concentrated in physically strenuous jobs (Park, Wagener, Winn, & Pierce, 1993). It seems plausible that a given health problem is more likely to be disabling for workers in such jobs.

Because much, although not all, of the evidence that Black/White differences in disability rates can account for differences in labor force participation rates relies on self-reports of disability status, we can not rule out the possibility that this association stems from factors that affect the propensity of Blacks versus Whites to report themselves as disabled. Economists have noted that the pecuniary rewards for continued work are smaller for Blacks than for Whites while employment opportunities are worse. These economic factors may provide incentives for able-bodied Blacks to report themselves as disabled (Parsons, 1980) or for Blacks with disabilities to adjust their labor force behavior to accommodate those disabilities at earlier ages than they might if the rewards of continued labor force participation were greater (Bound & Waidmann, 1992). From a different perspective, social psychologists have observed that among those out of the labor force Blacks are more likely to report themselves as disabled while Whites are more likely to report themselves as retired. They argue that reporting differences may be importantly conditioned by differences in role identification or in the extent to which work is seen as central to the identities of Whites versus Blacks (Jackson & Gibson, 1985; Gibson, 1988, 1991a,b).

This paper uses the first wave (beta release) of the Health and Retirement Survey (HRS) (Juster & Suzman, 1995) to examine patterns of labor force participation among non-Hispanic Black and non-Hispanic White adults in their 50s, with particular emphasis on Black/White differences in health. The extensive and varied health measures available in the HRS allow us to resolve some of the ambiguities regarding the interpretation of self-reported work disability. Until recently, nationally representative survey data were not available that contained both the detailed health information and detailed labor force and economic information necessary to disentangle the various influences on work disability. Rather than rely on a single measure of the complex concept of work disability, we are able to use more specific measures of health (chronic condition prevalence and activity limitation).

Specifically, we examine the extent to which Black/White differences in labor force status are associated with Black/White differences in health and socioeconomic characteristics. For men, we hypothesize that a significant part of observed race differences in labor force behavior between Blacks and Whites can be accounted for by actual health differences between these two populations. For women, we hypothesize that Black women's labor force participation rates would be above those of White women in the absence of real health differences between these groups. Finally, given the different social and economic circumstances faced by middle-aged

Black and White men and women, we hypothesize that Blacks and Whites differ not just in their levels of health status but also in the way health affects labor market participation.

METHODS

Data

The HRS covers a national sample of people born between 1931 and 1941 (inclusive); the first wave was conducted in 1992/93, and the sample frame primarily covers individuals aged 51-61 (although some respondents are aged 50 or 62). The HRS contains information on many of the forces thought to influence labor market behavior, including extensive measures of health status and functional ability (at least for a labor force survey), income, assets, pension coverage, demographic characteristics, and family structure. The HRS oversamples Blacks, Hispanics and residents of the State of Florida, and all analyses are weighted accordingly.

The HRS includes the spouses/partners of the survey population even if they themselves are out of the age range of the sample frame. Since respondents out of the sample frame do not constitute a representative sample, they are excluded here (although information from their records was used to identify household characteristics where appropriate). The dataset is thus restricted to respondents initially in the sample frame, as well as those spouses/partners born between 1931 and 1941. For ease of analysis, the data have been further restricted to non-Hispanic White and non-Hispanic Black respondents. In addition, basic demographic characteristics (e.g., gender, age, or race/ethnicity) were unavailable for several respondents, and these records were also excluded. Based on these restrictions, the pool of eligible respondents is 8655. However, several respondents did not respond to summary questions about their health and/or disability status and were excluded. The reduced dataset contains 8637 respondents, 4569 women and 4068 men. In this sample, 37 percent of Black and White women are out of the labor force, while 29 percent of Black men and 16 percent of White men are out of the labor force.

We note that this analysis derives from economic models of retirement, in which decisions about continued labor force participation at older ages and in deteriorated states of health depend, in part, on the financial and other economic alternatives faced by individuals. The Health and Retirement Survey includes data important for modeling these alternatives, including earnings histories from Social Security records and details regarding the nature and availability of pension and health insurance coverage. With only one wave of data it is nearly impossible to model the income available to individuals under several alternative scenarios (e.g., work, retirement, disability). As a result, we do not attempt to include these variables in our analysis.

Since there is a strong correlation between economic and health variables (individuals facing lower rewards to continued work are typically also in worse health), the fact that we cannot adequately model the economic incentives facing workers has important implications for the interpretation we give our estimates. In particular, our estimates should not be thought of as causal. Instead, they are probably best interpreted as an accounting exercise: we are trying to gauge the extent to which measurable differences in capacity to work between Blacks and Whites can account for observed differences in labor force status. In this framework, residual race differences in participation that remain after controlling for differences in health and demographic characteristics reflect differences in economic and social constraints on resources.

Measures

Labor Force Participation.-- Consistent with the rest of the literature, we define labor force participation as either working, unemployed but looking for work, or temporarily laid off or on sick leave. The HRS also contains extensive information on a variety of factors that may influence labor force behavior. Since participation in federal income maintenance programs targeted at the disabled often precludes substantial labor force activity, our model of labor force behavior includes measures of application for and participation in such programs. The disability section of the HRS contains such information on the two largest of these programs, Social Security Disability Insurance (DI) and Supplemental Security Income (SSI). Individuals who report that they have a health problem that limits their capacity for work are asked whether they have ever applied for benefits from the DI or SSI programs. Those who have applied are asked whether they were awarded benefits or not.

Demographic.-- All analyses are conducted separately by sex. The multivariate models outlined below include controls for several demographic and other individual characteristics. These include age in years; educational attainment, given by four categories (less than a high school diploma, high school graduate, some college, college graduate); whether the HRS interview was conducted by a proxy respondent; and whether the respondent is currently married with spouse present or living with a partner (a single dummy variable).

Health.-- The HRS includes an extensive range of measures of self-reported health, including general health status; prevalence of 39 specific conditions; measures of physical limitation in performing 21 daily activities; 11 measures of mood and depression based on the CES-D depression index (Radloff, 1977), and 3 measures of vitality. The survey also contains questions necessary to construct the CAGE alcoholism index (Mayfield, McLeod & Hall, 1974) . Inclusion of this index had no discernible effect on our results, but high item non-response would have required dropping several observations. Consequently, this index was not included in the results reported below. Since spouses were asked the same health questions, it is also possible to include measures of the spouse's health though our analysis found that this has no significant impact on labor force activity after we controlled for the respondent's own health.

We note that there are good reasons to believe that social forces influence individuals' responses to health questionnaires (Waidmann et al., 1995). In particular, there is a legitimate concern that Blacks and Whites may respond differently to the kinds of questions asked in the HRS. For example, there is some evidence that for a given level of actual morbidity, Blacks may be less likely than Whites to report suffering from specific chronic conditions (Andersen et al., 1987). In addition, while some studies have found that Blacks are no more likely than Whites to suffer from serious mental illness (Kessler et al., 1994; Williams, Takeuchi, & Adair, 1992), this finding may be influenced by the nature of the diagnostic instruments used (Neighbors, Jackson, Campbell, & Williams, 1989; Adebimpe, 1981; Williams and Fenton, 1994). Systematic differences in reporting will influence any results based on self-reported measures of health status. To some extent, however, our statistical methods may mitigate this influence.

Modeling Health

For our empirical models, we seek appropriate measures of health status. There are a number of possible alternatives for such measures. Since we are interested in how health affects labor market behavior, the most direct method might be to use information on self-reported work limitations. However, Black/White differences in the prevalence of self-reported work limitations may reflect a number of different factors other than health *per se*. Another possibility is to use individuals' reports on their overall health. However, this seems unnecessarily imprecise, both because it ignores the many detailed health measures available in the HRS and because the range of variation in self-rated health is limited by construction. In addition, different individuals may implicitly be responding on different scales, making responses difficult to compare across individuals. This heterogeneity is likely to threaten inferences based on such measures (Bound, 1991).

Another alternative is to include the numerous detailed health measures directly. This makes maximal use of the available information on health status. In addition, survey questions that are more specific and concrete should be less subjective and therefore less susceptible to the kinds of problems raised above. However, doing so presents difficulties in interpretation. First, there is no obvious way to quantify the marginal effect of changes in health *per se* on the outcomes of interest, and thus there is no way to compare the effects of marginal changes in health for Blacks and Whites, respectively. In a sense, there are as many Black/White differences as there are health covariates. In addition, the various detailed measures are presumably collinear to some degree (e.g., due to comorbidity), and such collinearity would also complicate interpreting the estimated coefficients on particular health measures.

Given these considerations, another possibility is to summarize the detailed health measures. The health science literature includes numerous methods for doing so, in particular for summarizing information on functional ability into a single measure (e.g., Suurmeijer et al., 1994). Other researchers have summarized measures of morbidity (e.g., House et al., 1990). The CES-D depression scale is included directly in the HRS. In general, each summary measure represents a weighted average of a number of components, where the weighting scheme is derived theoretically.

As an alternative to these methods, we use a latent variable model to construct an index of health. Specifically, we imagine the following model:

$$h^* = \beta'_4 X + \theta' Z + \nu \qquad (1)$$

where h^* represents health, a latent variable, and X is a vector of demographic characteristics. The vector Z is a vector of detailed health measures (e.g., chronic conditions, physical limitations, CES-D and vitality). While we do not observe h^*, we observe general health status, h, a categorical variable with five levels (excellent-poor). Assuming h is a monotonically increasing step function of h^* (i.e., h takes the value "excellent" when h^* is less than some threshold value, μ_1, "very good" when $\mu_1 < h^* < \mu_2$ etc.) and assuming that the error term ν is distributed normally, Equation (1) defines an ordered probit model. To create a summary measure of health, we first estimate Equation (1) to obtain estimates of β_4 and θ (as well as the μs). We then use the estimated coefficients from the model to construct

$$\hat{h}_i^* = \hat{\beta}'_4 X_i + \hat{\theta}' Z_i \qquad (2)$$

for each individual as a proxy for health status in our labor force models. The model is ordered so that larger (more positive) values of $\hat{h}^*$ represent worse health. As in the rest of this analysis, models are estimated separately by sex. However, in order to use this measure to compare Blacks and Whites, we pool Black and White respondents and calculate a single measure which applies to both. (In fact, when we estimated Equation (1) separately by race, the coefficients on the explanatory variables tended to be of very similar magnitudes and jointly were not statistically significantly different from one another.)

It is worth mentioning an important respect in which $\hat{h}^*$ differs from other indices in the literature. The fact that $\hat{h}^*$ is a function not only of Z (the detailed health measures) but also of

X (demographic characteristics) means that $\hat{h}*$ has been adjusted for the extent to which, for all the reasons mentioned above, the detailed health measures available in the HRS only partially measure race differences in health. As a result, even if the Z vector does not adequately account for health differences between Blacks and Whites, $\hat{h}*$ will. The one situation in which using $\hat{h}*$ to measure health differences will tend to under (or over) estimate differences between Blacks and Whites is if Blacks are optimistic (or pessimistic) relative to Whites when answering the general health question (Bound, 1991).

Modeling Labor Force Participation

Much of the literature on race differences in labor force behavior focuses primarily on whether or not respondents are participating in the labor force. However, we know that Blacks and Whites differ both in the rewards to continued work (e.g., Blacks earn substantially lower wages on average) and in the economic resources available to them should they leave the labor force (e.g., Blacks have substantially lower assets (Smith, 1993) and are less likely than Whites to be covered by private pensions (Hersch & White-Means, 1993); Black women in our sample are also less likely than White women to be married -- 48 percent of black Women and 76 percent of White women are married/living with a partner). Furthermore, tabulations using the HRS indicate that Black women and men who are out of the labor force are more likely to receive income from the DI or SSI programs and on average receive a higher fraction of total income from these sources (results are available from the authors). These findings suggest that the use of public insurance programs such as DI and SSI differentially affects the labor force decisions of Blacks and Whites, and in particular that Black women and men are less likely to have the resources to retire early unless they can qualify for federal money. In addition, because of program restrictions on income received from other sources, the receipt of DI/SSI benefits effectively precludes individuals from being in the labor force. Together, these factors suggest that modeling labor force participation without accounting for Black/White differences in DI/SSI application and participation may obscure Black/White differences in labor force behavior.

In this context, we describe current labor force status as follows. In addition to asking about current labor force status, the HRS asks respondents whether they have applied for benefits from either DI or SSI and whether they have received benefits from either program. We define three indicator variables, L_i, A_i, and R_i which equal 1 if the individual is in the labor force, has applied for DI/SSI benefits and has received DI/SSI benefits, respectively. Then the probability that a respondent is out of the labor force is given by

$$\begin{aligned}\Pr(L_i = 0) \equiv \Pr(L_i = 0|R_i = 1)[\Pr(R_i = 1|A_i = 1)\Pr(A_i = 1)] + \\ \Pr(L_i = 0|R_i = 0)[\Pr(R_i = 0|A_i = 1)\Pr(A_i = 1) + \Pr(A_i = 0)]\end{aligned} \tag{3}$$

where the notation Pr(x | y) means "the probability of x, given y." The first term in Equation (3) represents the probability that a respondent applies for benefits, is accepted and is out of the labor force. The second term represents the joint probability that the respondent either doesn't apply for benefits but is out of the labor force or that the respondent applies, is rejected and is out of the labor force.

Following from Equation (3), we therefore estimate three models: the probability that a respondent has applied for disability benefits (Equation 4), the probability of receipt among respondents who have applied (Equation 5), and the probability of being out of the labor force among respondents who are not receiving benefits (Equation 6).

$$\Pr(A_i = 1) = \mathrm{F}(\beta_1' X_i + \delta_1 h_i^*) \tag{4}$$

$$\Pr(R_i = 1 | A_i = 1) = \mathrm{F}(\beta_2' X_i + \delta_2 h_i^*) \quad (5)$$

$$\Pr(L_i = 0 | R_i = 0) = \mathrm{F}(\beta_3' X_i + \delta_3 h_i^*) \quad (6)$$

In each model, X_i is a vector of demographic variables, h_i^* represents health, a latent variable, and $\mathrm{F}(\cdot)$ represents the logistic distribution. Empirical estimation of Equations (4) - (6) will maintain the identity in Equation (3), since logit models have the useful property that the average of predicted probabilities will equal the actual probability of any outcome.

Since substantial work activity is taken as evidence that an individual is capable of work and leads to disqualification from receiving disability benefits, very few recipients of DI/SSI work. For ease of analysis we will assume that none does. This assumption has the effect of inflating predicted rates of non-participation by a trivial amount (less than half of a percentage point in this sample).

Analysis Method

We now turn to the central question posed by this research: what the labor force participation rate of Black men and women would be if their health status were the same as that of their White counterparts. We estimate all models separately by race and sex. Following Equations (4)-(6), we estimate $P = \mathrm{F}[\beta_w' X + \delta_w h^*]$ for the White sample and $P = \mathrm{F}[\beta_b' X' + \delta_b h^*]$ for the Black sample. In this notation, P represents the respective outcome variables from Equations (4)-(6), X and h^* are defined as above, and the vectors β_w and β_b and the terms δ_w and δ_b represent the race-specific coefficients to be estimated.

We seek to estimate what the levels of DI/SSI application, DI/SSI receipt and labor force participation would be among Black respondents if Blacks had the same distribution of the explanatory variables -- demographic and health characteristics -- as White respondents in the sample. The nature of the nonlinear estimation used here precludes directly comparing coefficients across the various models to assess the relationship between the various health and function variables on the one hand and the Black/White gap in labor force participation on the other. Instead, we use the estimated coefficients from our models to simulate the effects of such standardization.

Using the notation from above, we let $\hat{P}_i = F[\hat{\beta}'_w X_i + \hat{\delta}_w h_i^*]$ represent the predicted prevalence/level for the *i*th White in the sample, where $\hat{\delta}_w$ and $\hat{\beta}_w$ represent estimated coefficients. Similarly, $\hat{P}_i = F[\hat{\beta}'_b X_i + \hat{\delta}_b h_i^*]$ represents the predicted prevalence/level for the *i*th Black respondent. For the simulation, we then calculate $\hat{P}_i = F[\hat{\beta}'_b X_i + \hat{\delta}_b h_i^*]$ for each White sample member and then average across the White sample. The resulting number represents the predicted prevalence for Blacks were they to have the same distribution of characteristics as that of White respondents in the sample.

While we could also use White coefficients and Black characteristics, the thought experiment would be different. Part of the empirical difference between Blacks and Whites is caused by differences in the social environment. These simulations assume that we do not change that environment for Blacks, but rather change only education levels, marital status and health. Obviously, our choice of simulation techniques will affect our results substantively only when the logit coefficients differ between Blacks and Whites.

Thus it is important to address the issue of the magnitude of the difference between Black and White coefficients. Not only are Blacks more likely to be in poor health than Whites, but differences between the groups in terms of labor market experiences and in terms of skills imply that health may very well have a larger effect on the labor market activity of Black men and women relative to Whites. One way to examine the differential response to health status is to simulate equal improvements in health status for otherwise identical Black and White respondents using race-specific coefficients. For these simulations, we calculate the average values (by sex) of health (h^*), first for respondents who report their health as "very good" or "excellent" and then for respondents who report their health to be "fair" or "poor." Then, for a 55-year-old respondent with a high school education, we simulate each of the outcomes for the average individual in good health and the average individual in poor health. These simulations demonstrate the differential effect of health on the labor force participation of Blacks and Whites as well as the differential effects for married and unmarried individuals.

RESULTS

Black/White Differences in Health

Black women and men in our sample are significantly more likely than Whites to report their overall health as fair or poor: 36 percent of Black women report being in fair/poor health, compared to 17 percent of White women, while 33 percent of Black men and 17 percent of White men report fair/poor health. Black women and men in the HRS sample frame are also significantly more likely to report having most specific conditions assessed in the survey, and have universally greater difficulty performing each activity of daily living and instrumental activity of daily living than their White counterparts (Schoenbaum and Waidmann, 1995).

To put these differences in the context of our health index, Table 1 presents estimates of the coefficient on the race dummy from several alternative specifications of Equation (1). Given the discrete nature of the dependent variable, the units of h^* are arbitrary. Standard practice (and most computer programs) normalize estimates so that var(v)=1. However, as we move across specifications, the interpretation of v changes. To maintain comparability, we have chosen to normalize h^* such that var(h^*)=1 (Winship & Mare, 1984). As a result, coefficients can be interpreted as partially standardized -- i.e., as the effect of a unit change in the independent variable in terms of standard deviations on health.

[TABLE 1 here]

As we expect, being Black is associated with poorer health; thus the health of an average Black woman is 0.588 standard deviations worse than that of the average White woman in our sample, while the health of the average Black man is 0.398 standard deviations worse than that of the average White man! As other demographic control variables are added (Model 2), the coefficient decreases in magnitude controlling for marital status, proxy status and education accounts for 26 percent (e.g., 0.433/0.588) of the health difference among women and 44 percent among men. Controlling for age and the full set of detailed health measures eliminates 56 percent of the health gap for women and 41 percent for men. When the demographic and detailed health characteristics are entered together (Model 3), the coefficient is further reduced but not eliminated, with around 40 percent of the Black/White gap remaining. The fact that including education and marital status in the health equations lowers the magnitude of the coefficients on race implies that race differences in education and marital status can statistically account for part, but not all, of the large health difference between middle-aged Whites and Blacks (Schoenbaum and Waidmann, 1995).

The substantial residual race differences that we continue to find in the last row of Table 1 presumably reflect primarily differences in "actual" health that are not captured by the detailed health measures available in the HRS. Although the extensive health measures available in the HRS should avoid some of the problems associated with measures based on the overall global measure, even the numerous health measures available in the HRS only partly describe individual health status: they do not cover all aspects of health; they are subject to measurement error (Edwards et al., 1994; Mathiowetz & Lair, 1994); and, with respect to specific conditions, they cover prevalence but provide little information regarding severity. In addition, to the extent that Blacks do respond to the specific health questions in the HRS differently than do Whites, the coefficient on race in Equation (1) will also pick this up.

Accounting for Labor Force Differences: Race Differences in the Distribution of Health

Table 2 presents the results of the labor force simulations described above. The dependent variables are the respective labor force outcomes, as discussed above. The left side of each panel lists different model specifications (the demographic variables are defined in Appendix Table 1, while the health measures are described above). Since the overall focus of Table 2 is on Black/White differences in labor force outcomes and not on the effects of the covariates on labor force status *per se*, information on the regression coefficients is not presented here. Instead, we present actual and predicted rates for respective outcomes.

[TABLE 2 here]

The first two columns in Table 2 present estimates based on Equation (4), the probability that respondents applied for DI/SSI, and Equation (6), the probability that respondents who are not on DI/SSI are out of the labor force. While we estimated Equation (5), the probability of receiving DI/SSI among respondents who applied, we do not present results from this model because none of the independent variables has much explanatory power. As a result, the predicted proportion of DI applicants who receive benefits is nearly constant, regardless of the specification used.

The final column in Table 2 presents the overall probability that respondents are out of the labor force. These probabilities are not estimated directly but rather are derived from Equation (3). Specifically, we used the estimated results from Equations (4)-(6), together with the assumption that all respondents who receive DI/SSI are out of the labor force, to solve for the left side of Equation (3), the probability of being out of the labor force.

Application for DI/SSI. -- The first column in Table 2 indicates that Black women and men are much more likely to apply for DI/SSI. Since Blacks and Whites have essentially identical age distributions in our sample (results available from the authors), age alone plays no role in Black/White differences in labor force outcomes in our sample, but controlling for age *and* education (Model 1) accounts for around a third of the gap for both women and men. Adding marital status to this model (Model 2) accounts for a total of more than 60 percent of the gap among women and about half the gap for men. The difference in predicted rates between Models 1 and 2 give the marginal effect of differences in marital status, which indicate that differences in marital status alone account for 29 percent of the gap among women and 15 percent among men. Adding controls for health accounts for 116 percent (Model 3) of the difference in application rates between Black and White women, and 97 percent of the difference among men.

Out of Labor Force /Not on DI/SSI. -- The next column in Table 2 indicates that, among respondents who are not on DI/SSI, Black women are substantially less likely than White women and Black men are substantially more likely than White men to be out of the labor force. Model 1 indicates that if Black women who are not on DI/SSI had the educational attainment of White women, an even lower fraction of them would be out of the labor force. Model 2 indicates that differences in marital status have equal and opposite effects as education differences. Finally, Models 3 indicates that if Black women who are not on DI/SSI had the health status of White women in this group, their labor force participation would be substantially higher than it currently is.

Among men who are not on DI/SSI, controlling for education differences widens the gap between Blacks and Whites, the opposite of the effect observed for women. This apparently anomalous finding, however, seems to be a result of the imprecise estimate of the effect of educational attainment in the underlying logit. The marginal effect of controlling for differences in marital status is to narrow the gap between Black and White men, lowering the fraction of Blacks who are out of the labor force. Similarly, controlling for differences in health status narrows the Black/White difference, raising the predicted labor force participation of Black men.

Out of Labor Force. -- The final column in Table 2 examines overall Black/White differences in labor force participation. As noted above, equal fractions of Black and White women are out of the labor force, while a much higher fraction of Black men is currently out of the labor force. For women, Model 1 indicates that, controlling for differences in education attainment, Black women would have higher participation rates than White women. After controlling for education, differences in marital status do not account for any of the difference in participation rates; this finding is consistent with the previous findings, which indicate that higher rates of marriage lower the predicted application rate of Black women but raise the predicted likelihood that Black women not on DI/SSI would be out of the labor force. Finally, Model 3 suggests that, in the absence of health differences between Black and White women, a much lower percentage of Black than White women would be out of the labor force.

In terms of Equation (3), these results imply that more than a third of the Black women currently out of the labor force would be in the labor force if their demographic and health characteristics were the same as those of White women. Our findings imply that more than 70% of this increase is due to decreases in the fraction receiving disability benefits. The rest is made up of increases in the participation rate of Black women who do not receive benefits, as seen in the middle set of simulations. We find that poor health is strongly implicated in reducing the participation of Black women who do not receive benefits. Relatively low levels of educational attainment also suppress participation while relatively lower rates of marriage serve to inflate participation rates.

Among men, Black/White differences in education, marital status and health each accounts for substantial fractions of the Black/White differences in labor force participation. Education differences alone account for 12 percent of the gap, while differences in marital status account for a further 17 percent. Finally, after controlling for demographic differences, differences in health status (Model 3) account for an additional 54 percent of the gap.

In terms of Equation (3), more than one-third of Black men who are out of the labor force would be working if they had the demographic and health characteristics of White men. Our results imply that most of this increase (about 80%) can be accounted for by decreases in the fraction receiving disability benefits. The participation rate for the non-DI population would increase with improvements in health, but not nearly as much as they would for women who do not receive benefits. The only anomalous finding in this table is that for those not on DI, Black men with higher levels of education work less than those with lower levels of education.

Accounting for Labor Force Differences: Race Differences in the Effects of Health

Application for DI/SSI. -- Table 3a presents results for the probability of applying for DI/SSI. Poor health is a very strong predictor of application and is stronger for Blacks than for Whites. This result is particularly true when comparing White and Black men. While application rates for men in good health are similarly small for Blacks and Whites, Black men in poor health are much more likely to apply for benefits. This may reflect differences in skills and experiences between Blacks and Whites, which may lead Blacks to have greater difficulty adapting to the onset of poor health; or to the fact that the ratio of disability benefits to previous labor income is typically higher for Blacks than Whites, especially among men. In addition, for every race, sex and health category, unmarried women and men are significantly more likely to apply for DI/SSI. Unmarried women may be more likely to have sufficient employment history to be eligible to apply for DI and sufficiently low household income to qualify for SSI, while married men generally have stronger labor force attachment than unmarried men.

[TABLE 3 here]

Out of Labor Force /Not on DI/SSI. -- Table 3b presents results for the probability of being out of the labor force among respondents who are not on DI/SSI. Poor health is a strong predictor of being out of the labor force, although the odds ratios are much smaller than in the previous panel, and the effect of poor health is stronger for Blacks than for Whites. While participation rates for men in good health are similar for Blacks and Whites, Black men in poor health are much more likely to be out of the labor force than their White counterparts. Several explanations for this dramatic difference seem possible. First, differences in job histories and employer willingness to accommodate workers in poor health may work in favor of White men staying in the labor force. It is also reasonable to believe that the relative rewards for continued work (wages) favor White men. This explanation, however, leaves unanswered the question of what these men do for income. One possibility for married men might be reliance on spousal income.

Among women, married Black and White women in poor health are significantly more likely to be out of the labor force than any other group of women. Black married women in good health are much less likely than White women to be out of the labor force, as are married Black women in poor health, though this difference is somewhat smaller. While unmarried Black women in good health are about as likely to be out of the labor force as their White counterparts, Black women in poor health are more likely to be out of the labor force than their White counterparts. These findings for women suggest, as others have found, that in good health Black women rely more on their own resources than White women.

Out of Labor Force. -- Table 3c presents results for the overall probability of being out of the labor force; as in Table 2, the results are derived from the previous models rather than estimated directly. As expected, we find that for overall labor force participation, health is relatively more important for Blacks than for Whites, particularly in the labor force participation of Black men.

DISCUSSION

Our findings from the Health and Retirement Survey indicate that the relatively poor health of Black men and women, when compared to their White counterparts, accounts for much of the apparent difference in the timing of labor force exit. Health differences would appear to account for virtually all of the two-to-one difference between the fraction of Black and the fraction of White middle-aged men out of the workforce. Among women, our results suggest that older Black women would have higher labor force participation than White women, as they do at younger ages, if Black women had health status similar to Whites in our sample.

Our findings also seem to indicate that while health is important for both Blacks and Whites in accounting for early exits from the labor force, it seems to play a more central role for Blacks than for Whites. We have found consistent evidence suggesting that Blacks in poor health are more likely to leave the workforce than Whites in poor health. It seems plausible that this difference in responsiveness reflects the very different social and economic environments faced by the two populations. On the one hand, Blacks in good health are less likely to have access to the financial resources to permit them to retire early. They are less able to count on a spouse's earnings, have less in the way of financial assets, and Black men, in particular, are less likely to be in jobs that include pension benefits. On the other hand, both Black men and women are more likely to be in physically demanding jobs, jobs for which good health is important, and those with impairments may have particular trouble finding alternative employment.

While our results are suggestive of the factors which explain why Blacks seem more responsive than Whites to poor health, the Health and Retirement Survey contains much information which might shed more light on these factors. Future work, especially that which utilizes the longitudinal nature of the study, should not only investigate the source of the residual differences, but also examine the consequences of these differences for the economic well-being of older Black and White adults.

References

Adebimpe V. (1981). Overview: White Norms and Psychiatric Diagnosis of Black Patients. *American Journal of Psychiatry,* 138(3), 279-285.

Andersen, R.M., Mullner, R.M., & Cornelius, L.J. (1987). Black-White Differences in Health Status: Methods or Substance? *Milbank Quarterly,* 65(Supp 1), 72-99.

Bound, J. (1991). Self-Reported versus Objective Measures of Health in Retirement Models. *Journal of Human Resources,* 26, 106-138.

Bound, J., Schoenbaum, M., & Waidmann, T. (1995). Race and Education Differences in Disability Status and Labor Force Attachment. *Journal of Human Resources,* 30, S225-S267.

Bound, J. & Waidmann, T. (1992). Disability Transfers and the Labor Force Attachment of Older Men: Evidence from the Historical Record. *Quarterly Journal of Economics,* 107, 1393-1419.

Edwards, W.S., Winn, D.M., Kurlantzick, V., Sheridan, S., Berk, M.L., Retchin, S., & Collins, J.G. (1994). Evaluation of National Health Interview Survey Diagnostic Reporting. *Vital and Health Statistics,* 2(120)

Geronimus, A.T. (1992). The Weathering Hypothesis and The Health of African American Women and Infants: Evidence and Speculations. *Ethnicity and Disease,* 2(Summer), 207-221.

Gibson, R. (1988). The Work, Retirement, and Disability of Older Black Americans. In J.S. Jackson (Ed.), *The Black American Elderly.* New York: Springer, 304-324.

Gibson, R. (1991a). The Subjective Retirement of Black Americans. *Journal of Gerontology: Social Sciences,* 46(4), S204-S209.

Gibson, R. (1991b). Retirement in Black America. In J.S. Jackson (Ed.), *Life in Black America*. Newbury Park CA: Sage, 179-198.

Hayward, M.D., Friedman, S., & Chen, H. (1996). Race Inequities in Men's Retirement. *Journal of Gerontology: Social Sciences*, 51B, S1-S10.

Hersch, J., & White-Means, S. (1993). Employer-Sponsored Health and Pension Benefits and the Gender/Race Wage Gap. *Social Science Quarterly*, 74(4), 851-866.

House, J.S., Kessler, R.C., Herzog, A.R., Mero, R.P., Kinney, A.M., & Breslow, M.J. (1990). Age, Socioeconomic Status, and Health. *The Milbank Quarterly*, 68(3), 383-411.

Jackson, J.S., & Gibson R. (1985). Work and Retirement Among the Black Elderly. In Z. Blau (Ed.),*Current Perspectives on Aging and the Life Cycle*. Greenwich CT: JAI Press, 193-222.

Juster, F.T. & Suzman, R. (1995). An Overview of the Health and Retirement Study. *Journal of Human Resources*, 30, S7-S56.

Kessler, R.C., McGonagle, K.A., Zhao, S., Nelson, C.B., Hughes, M., Eshleman, S., Wittchen, H-U., & Kendler, K.S. (1994). Lifetime and 12-Month Prevalence of *DSM-III-R* Psychiatric Disorders in the United States. *Archives of General Psychiatry*, 51, 8-19.

Manton K.G., Patrick, C.H., & Johnson, K.W. (1987). Health Differentials Between Blacks and Whites: Recent Trends in Mortality and Morbidity. *Milbank Quarterly*, 65(Supp 1), 129-199.

Mathiowetz, N.A., & Lair, T.J. (1994). Getting Better? Change or Error in the Measurement of Functional Limitations. *Journal of Economic and Social Measurement*, 20, 237-262.

Mayfield, D., McLeod, G., & Hall, P. (1974). The CAGE Questionnaire: Validation of a New Alcoholism Screening Instrument. *American Journal of Psychiatry*, 131,1121-1123.

Neighbors, H.W., Jackson, J.S., Campbell, L., & Williams, D. (1989). The Influence of Racial Factors on Psychiatric Diagnosis: A Review and Suggestions for Research. *Community Mental Health Journal,* 25(4), 301-311.

Park, C.H., Wagener, D.K., Winn, D.M., & Pierce, J.P. (1993). Health Conditions Among the Currently Employed: United States, 1988. *Vital and Health Statistics, 10(186).*

Parsons, D.O. (1980). Racial Trends In Male Labor Force Participation. *American Economic Review*, 70, 911-920.

Pope, A.M., & Tarlov, A.R. (Eds.) (1991). *Disabilities in America: Toward a National Agenda for Prevention.* Washington DC: National Academy Press.

Radloff, L.S. (1977) The CES-D scale: A Self-Report Depression Scale for Research in The General Population. *Applied Psychological Measurement*, 1, 385.

Ries, P. (1990). Health of Black and White Americans, 1985-87. *Vital and Health Statistics,* 10(171).

Schoenbaum, M., & Waidmann, T. (1995). Race, Socioeconomic Status and Health: Accounting for Race Differences in Health. Population Studies Center Research Report No. 95-333.

Smith, J.P. (1993). Racial and Ethnic Differences in Wealth Using the HRS. Health and Retirement Study Working Paper No. 94-022.

Suurmeijer, T.P.B.M., Doeglas, D.M., Moum, T., Briançon, S., Krol, B., Sanderman, R., Guillemin, F., Bjelle, A., & van den Heuvel, W.J.A. (1994). The Groningen Activity Restriction Scale for Measuring Disability: Its Utility in International Comparisons. *American Journal of Public Health,* 84(8), 1270-1273

Waidmann, T., Bound, J., & Schoenbaum, M. (1995). The Illusion of Failure: Interpreting Trends in Self-Reported Health. *Milbank Quarterly,* 73(2), 253-287.

Williams, D.R., Takeuchi, D., & Adair, R. (1992). Socioeconomic Status and Psychiatric Disorder Among Blacks and Whites. *Social Forces,* 71, 179-194.

Williams, D.R., & Fenton, B.T. (1994). The Mental Health of African Americans: Findings, Questions, and Directions. In Ivor Livingston (Ed.), *Handbook of Black American Health: The Mosaic of Conditions, Issues, Policies, and Prospects.* Westport, CT: Greenwood Press, 253-268.

Winship, C., & Mare, R.D. (1984). Regression Models with Ordinal Variables. *American Sociology Review,* 49, 512-525.

Table 1: Race Differences in Overall Health

controlling for:	WOMEN	MEN
age	0.588	0.398
	(0.043)	*(0.047)*
age, education and marital status	0.433	0.223
	(0.044)	*(0.049)*
age, education, marital status and detailed health characteristics	0.214	0.155
	(0.030)	*(0.033)*

(Standard errors in parentheses)

Notes: Estimated effects can be interpreted as the black/white difference in overall health measured in standardized units. Estimates were derived from ordered probit estimates.

Table 2: Simulations of the Effects of Differences in Educational Attainment, Marital Status, and Health on Labor Force Behavior

	Equation (4): % Applied to DI/SSI	Equation (6): % OLF | not on DI/SSI	Derived: %OLF[a]
WOMEN			
Black (actual rate)	.184	.289	.376
Standardized on			
education	.148	.266	.340
education and marital status	.117	.288	.341
education, marital status and health	.058	.229	.255
White (actual rate)	.075	.346	.375
MEN			
Black (actual rate)	.196	.179	.289
Standardized on			
education	.159	.194	.274
education and marital status	.143	.188	.253
education, marital status and health	.091	.142	.188
White (actual rate)	.087	.111	.167

NOTES: Simulations derived from logit estimates. See text for details.

Table 3: Simulations of the Differences in the Effect of Health Status on Labor Force Participation Behavior[a]

A. Probability of Application to DI/SSI, for good vs. poor health

		Health Status	
WOMEN		**Good**	**Poor**
Married	**Black**	.004	.142
	White	.012	.247
Unmarried	**Black**	.008	.237
	White	.022	.389
MEN		**Good**	**Poor**
Married	**Black**	.008	.385
	White	.013	.340
Unmarried	**Black**	.015	.547
	White	.021	.454

B. Probability OLF | Not on DI/SSI, for good vs. poor health

		Health Status	
WOMEN		**Good**	**Poor**
Married	**Black**	.169	.462
	White	.359	.559
Unmarried	**Black**	.097	.313
	White	.129	.251
MEN		**Good**	**Poor**
Married	**Black**	.057	.408
	White	.070	.200
Unmarried	**Black**	.075	.484
	White	.080	.227

C. Probability OLF, for good vs. poor health

		Health Status	
WOMEN		**Good**	**Poor**
Married	**Black**	.172	.534
	White	.363	.618
Unmarried	**Black**	.104	.470
	White	.141	.448
MEN		**Good**	**Poor**
Married	**Black**	.063	.559
	White	.077	.393
Unmarried	**Black**	.088	.734
	White	.091	.447

Notes: Simulations represent predicted probabilities for a 55 year old individual with a high school education

Appendix Table 1: Variables used in analysis

Education	
less than high school	1 if R completed <12 years of education and doesn't report HS diploma
high school graduate	1 if R completed 12 years of education or reports HS diploma/equivalent
some college	1 if R completed >12 years of education and doesn't report BA or more
college graduate	1 if R completed >12 years of education and reports BA or more
Demographic Measures	
age	Age of respondent at time of HRS interview
LFP	1 if R is working, unemployed/looking for work, or laid off/on leave
black	1 if R is black/African American and not Hispanic
General Health Status/Emotional Health Status	
very good/excellent	
good	
fair	
poor	
General Disability Status	
limited	1 if R has permanent/recurrent health problem that limits/prevents paid work
partial limitation	1 if R has health problem that limits but doesn't prevent paid work, and R has work history
severe limitation	1 if R has health problem that limits paid work, and R cannot work or has never worked
Health Conditions[a]	
hypertension	1 if R has ever been told by MD he has hypertension
medication	1 if R is currently taking medication for hypertension
current	1 if R currently has hypertension
diabetes	1 if R has ever been told by MD he has diabetes
current	1 if R currently has diabetes
cancer	1 if R has ever been told by MD he has cancer (any type except skin)
lung disease	1 if R has ever been told by MD he has a chronic lung disease
medication	1 if R is currently taking medication for lung disease
short of breath	1 if R is sometimes short of breath because of lung disease
cough/wheeze	1 if R sometimes coughs/wheezes because of lung disease
limits activity	1 if R is limited in usual activities by lung disease
heart problem	1 if R has ever been told by MD he has a heart problem
heart attack	1 if R has had a heart attack/myocardial infarction
angina	1 if R currently has angina
medication	1 if R is currently taking medication for angina
congestive heart failure	1 if R has ever been told by MD he has congestive heart failure (CHF)
seen MD	1 if R has seen MD in last year for heart problem
heart procedure	1 if R has ever had cardiac catheterization/coronary angiogram/angioplasty
heart surgery	1 if R has ever had surgery on heart
stroke	1 if R has ever been told by MD he has had a stroke
limits activity	1 if R has current health problem because of stroke
mental	1 if R has been told by MD he has emotional/nervous/psychiatric problem
current	1 if R has had emotional/nervous/psychiatric problem in last year
medication/treatment	1 if R is currently receiving treatment or medication for emotional problem

Appendix Table 1 (continued): Variables used in analysis

Health Conditions[a] (continued)	
arthritis	1 if R has ever had arthritis or rheumatism
pain	1 if R sometimes has pain/stiffness/swelling in joints
medication	1 if R is currently receiving treatment or medication for arthritis
seen MD	1 if R has seen MD in last year (specifically) for arthritis
asthma	1 if R currently has asthma
back	1 if R currently has back problems
legs	1 if R currently has problems with feet/legs
kidney	1 if R currently has kidney/bladder problems
ulcer	1 if R currently has an ulcer
cholesterol	1 if R currently has high cholesterol
sight	1 if R reports eyesight as fair or poor
hearing	1 if R reports hearing as fair or poor
Physical Function[b]	
jog 1 mile	Normalized measure of ability to run or jog 1 mile
walk several blocks	Normalized measure of ability to walk several blocks
walk 1 block	Normalized measure of ability to walk 1 block
walk across room	Normalized measure of ability to walk across a room
sit 2 hours	Normalized measure of ability to sit about 2 hours
stand up	Normalized measure of ability to get up after sitting long periods
get out of bed	Normalized measure of ability to get in and out of bed unaided
climb several flights stairs	Normalized measure of ability to climb several flight of stairs without rest
climb 1 flight stairs	Normalized measure of ability to climb 1 flight of stairs without rest
lift 10 lbs.	Normalized measure of ability to lift/carry more than 10 pounds
stoop	Normalized measure of ability to stoop/kneel/crouch
pick up dime	Normalized measure of ability to pick a dime from a table
raise arms	Normalized measure of ability to extend arms above shoulder level
push large objects	Normalized measure of ability to push/pull large objects (e.g. furniture)
shower	Normalized measure of ability to bathe/shower unaided
eat	Normalized measure of ability to eat unaided
dress	Normalized measure of ability to dress unaided
use a calculator	Normalized measure of ability to use a calculator to help balance the checkbook
use a microwave	Normalized measure of ability to use a microwave oven after reading the instructions
use a map	Normalized measure of ability to use a map to get around in a strange place
Emotional Function[c]	
depression index (CES-D)	Average of eleven measures of mood and depression
vitality index	Average of three measures of energy and vitality
Pain[d]	
worst pain	Normalized measure of chronic pain – when pain is worst
usual pain	Normalized measure of chronic pain – most of the time

[a] Individuals who reported having a particular condition were coded as 1 for these variables. All others coded as 0.

[b] To questions about functional limitations, respondents could answer

1="Not at all difficult"	3="Somewhat difficult"	5="Don't do"
2="A little difficult"	4="Very difficult/can't do"	

We recoded response 5 as response 4. The resulting four responses were rescaled to a standard normal distribution. That is, if F(x) is the cumulative standard normal function, and if A percent answered 1, B percent answered 2, C percent answered 3, and D percent answered 4, responses would be recoded such that those responding A would be assigned V such that F(V)=A, those answer 2 would be assigned W such that F(W)=A+B, and so on. When responses to these questions were missing, the value of the normalized variable was imputed. Individuals with missing values were assigned the appropriate race/gender specific mean adjusted for the individual's value of the general health status variable. Finally, for each measure, all values were normalized (by adding or subtracting a constant) so that white men had a mean value of zero for each limitation.

[c] To the questions of mood and depression, respondents could answer

0="None or almost none of the time"	2="Most of the time"
1="Some of the time"	3="All or almost all of the time"

Questions used in constructing the depression (CES-D) index were: "In last week, respondent —"

- felt depressed
- felt everything he did was an effort
- had restless sleep
- felt happy
- felt lonely
- felt people were unfriendly
- enjoyed life
- felt sad
- felt people disliked him
- could not "get going"
- had poor appetite

Questions used in constructing the vitality index were: "In last week, respondent —"

- had a lot of energy
- felt tired
- felt "really rested" when awoke in morning

Each index represents the average of the responses to the various component questions. Missing values of individual components were imputed, as above.

[d] To the question coded as WORST PAIN, respondents could answer

0=R has no chronic pain	2=R has chronic pain, pain is moderate at worst
1=R has chronic pain, pain is mild at worst	3=R has chronic pain, pain is severe at worst

To the question coded as USUAL PAIN, respondents could answer

0=R has no chronic pain or pain is mild at worst
1=R has moderate/severe chronic pain, pain is mild most of the time
2=R has moderate/severe chronic pain, pain is moderate most of the time
3=R has moderate/severe chronic pain, pain is severe most of the time

WORST PAIN and USUAL PAIN were rescaled to a standard normal distribution, as above. Missing values for both pain variables were imputed, as above.