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The Effect of Historically Black Colleges on Wages of Black Students: An Analysis by Gender

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I. Introduction

Historically Black Colleges and Universities (HBCUs) have played an important role in educating African American students. Throughout much of their histories, they were virtually the only source of post secondary education for many black students. Although they have always struggled financially, their place in American higher education was secure until recently. As other institutions opened up to black students, HBCUs had to compete for enrollments, frequently losing the battle for the best minority students. More recently, the U.S. legal system has thrown the future of some HBCU campuses in doubt with rulings such as U.S. v. Fordice in 1992. This ruling, with a goal of equalizing access and expenditures between white and black students in post secondary education in Mississippi, left open the possibility of closing or merging historically black campuses with historically white ones. Recent recommendations have included enhancing graduate programs at two HBCU campuses and raising admission standards at all HBCU

campuses to attract more white students to them. Raising admission standards in particular, is threatening to many students (Chronicle of Higher Education, 1996).

These are controversial proposals given the literature on the effects of attending HBCUs. Research has shown black students are more likely to complete a B.A. and have better experiences on campus at HBCUs (Ehrenberg and Rothstein 1994, Hoffman 1992, Deskins 1991, Pascarella and Terenzini 1991, Flemming 1983, 1984). Some research has also shown benefits to HBCU attendance in the form of higher wages in the labor market (Constantine 1995).

This study attempts to clarify the reported wage benefits of attending an HBCU by examining the impact of HBCU attendance on men and women. There has been virtually no research on the individual experiences of black men and women in college in general, let alone at HBCUs.[1] This is surprising since there have traditionally been more black women on college campuses than men.[2] The difference in enrollment alone suggests the decision to attend college may be different for black men and women.

II. Relevant Literature

The only comprehensive study of black men and women at black colleges is by Flemming (1983, 1984). Flemming compared black students at HBCUs to black students at "similar," mostly white institutions. Flemming's outcomes include: B.A. attainment, involvement in extracurricular activities and attitudes and expectations. She surveyed freshmen and seniors at selected institutions and focused on the changes that occur while students are in college. Flemming found that both men and women persist to graduation more successfully at HBCUs.

[1] The only exceptions I know that consider men and women separately are Flemming's 1983 and 1984 studies and a recent study by Marilyn Ross (1998) looking at men on one HBCU campus only.

[2] Black women have outnumbered black men at all institutions for at least the last 25 years. However, their representation at all institutions has grown rapidly. In 1976, 54% of black students enrolled at all institutions were

However, Flemming finds an interesting difference between men and women. Men at HBCUs undergo more "positive" changes (as measured by involvement in the college and improvement in attitudes) than men at non-HBCUs. In contrast, HBCU and non-HBCU women start with similar attitudes as freshmen, but black women at HBCUs appear to become more passive as they progress through college than their non-HBCU counterparts. As seniors, HBCU women respond less actively to questions about current activities and expectations. In fact, black women at HBCUs experience similar changes to white women at mostly white institutions.

Flemming hypothesizes that the presence of men who are becoming more empowered while in college can cause women to accept a more secondary role. In other words, since men at HBCUs undergo positive, perhaps empowering changes, women at HBCUs become more passive during their college experience.

There are other reasons for analyzing the effect of HBCU attendance on wages separately for men and women. First, since I am considering wages, labor market experiences and hence, wage models usually differ for men and women.[3] Second, as will be shown in Table 1, average wages for women who attend HBCUs are much higher than women who attend non-HBCUs. This is surprising in light of Flemming's results. If Flemming's results are true, the difference in mean wages either reflects the potential bias when analyzing HBCU attendance without conditioning on the choice to attend an HBCU, or the types of outcomes that Flemming considers do not impact later performance in the labor market, e.g. becoming a more "passive" black women may not impact wages.

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women, 45% were men. By 1994, this had changed to 62% vs. 38%. The corresponding figures at HBCUs are 55% vs. 45% in 1976 and 60% vs. 40% in 1994. (Nettles and Perna 1997).

[3] This has traditionally been due to the much lower labor force participation rate of women compared to men. However, the difference in labor force participation rates for black men and women is much less dramatic than for white men and women.

III. Model of College Choice and Wages

The model used to analyze wage effects of attending HBCUs closely follows that used by Constantine (1995). The 1995 study utilized data pooled for men and women. As the results of this paper show, estimating separate models for men and women reveal different phenomena which are masked in the pooled model.

A. Econometric Approach

The econometric approach here is based on a method for correcting for self-selection when estimating wages developed by Lee (1982, 1983).[4] It is a two stage procedure that involves first estimating a model of college choice and then conditional on that choice, estimating wage equations. The main difference between the Lee approach and the approach developed by Heckman (1979) is that the Lee approach can be generalized to models for which there are more than two choices.

If I could measure all of the characteristics of an individual that affect wages, I could simply estimate the following equation:

$$(1)\ W^{*} = Y\Pi + S\pi$$

where Y is a vector of individual characteristics and S is the college sector chosen (an individual subscript, i, is dropped for all equations). In this model, I assume black high school graduates have three choices: (1) seek no postsecondary schooling or enroll in a vocational or two year degree program, (2) enroll in a four year HBCU or (3) enroll in a four year non-HBCU. An Ordinary Least Squares (OLS) estimate of equation 1 would yield an unbiased estimate, measured by π, of the effect of attending a black college, as well as a non-black college or no college. However, most literature has found the estimate of π to be biased since there are characteristics of

an individual that are difficult to measure (e.g. innate intelligence, discipline, etc.) which may be correlated with the college sector choice and wages.

I can obtain an estimate of wages in each sector chosen by estimating the following equation for each individual:

$$(2)\ Ws = XsBs + \mu s$$

where X is a vector of individual characteristics, s is sector choice and μ is a normally distributed error term. The problem with the estimates of wages from equation 2 is there may still be unobservable characteristics which influence the sector choice which also affect wages. The best estimate of wages would be to estimate equation 2 for each sector **conditional** on the fact that the sector was chosen by the individual. If we assume individuals maximize their utility in making their college sector choice we can obtain a "selection corrected" version of equation 2:

$$(3)\ W_s = X_sB_s - \varphi(J(Z_s\gamma_s))/Fs(Z_s)\lambda_s + \eta_s$$ [5]

where λ is the parameter estimate of the variables captured by this correction term. The correction term (generated from the predicted probabilities of choosing any given sector) represents those characteristics which influenced sector choice not captured in the X vector.

An important difference between the approach I use here and other attempts to model wages is I make no attempt to develop a full structural model of wages. My sample sizes are

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[4] The approach is more fully described in Constantine (1995).

[5] As detailed in Lee (1982, 1983), the probability that an individual chooses any given sector, S, is $Ps = Pr(((Z_s\gamma + \nu_s) > (Z_j\gamma + \nu_j))\ \forall\ s \neq j$ where Z is a vector of characteristics which affect sector choice, s, and ν is an individual error term. In this case, with three choices of sectors, I assume a logistic distribution over ν_s and obtain the probability an individual chooses any sector (denoted 1, 2 and 3) with:
(4) $Ps = e\ Z_s\gamma/(e^{Z1\gamma} + e^{Z2\gamma} + e^{Z3\gamma})$. The problem is reduced to a choice between two sectors by generating the variable ε_s = Max Uj where j=(1, 2, 3) and $j \neq s$. That is, ε_s, represents the "next highest" utility that could have been gained from another sector beside the one actually chosen. In practice, this is obtained from the probability estimates of equation 4. Lee shows that ε_s can be transformed into a standard normal random variable where $\varepsilon^*_s = J(\varepsilon_s) = \Phi^{-1} F(\varepsilon_s)$, where Φ^{-1} is the inverse of the standard normal distribution and J(.) is a strictly increasing function. Hence, the selection correction term is equation 3 in the text, is a Heckman type Inverse Mills ratio, i.e. the pdf/cdf of a function with a standard normal distribution.

simply too small to try and model all of the major factors which affect wages (e.g. degree attainment, tenure, experience and occupation). Hence my wage equations are reduced form, that is, they contain only those characteristics which were determined at the point the respondent was making the decision whether to enroll in college. Thus, any effects I find of HBCU attendance will encompass all direct and indirect effects. For example, it may be that HBCU attendance directly enhances labor market outcomes for black students through superior career service and placement functions or, they may indirectly enhance outcomes by making it more likely a student receives a four year degree or chooses a lucrative occupation. This model will not be able to differentiate between these types of effects.

B. Identification of the Model

One of the most difficult problems in estimating two stage "selection corrected" models is identifying the parameters of the model. I assume that the decision to enroll in college is an investment decision. The "costs" are weighed against the "benefits" and I assume an important benefit is improved wages in the labor market after schooling is completed. The costs can be measurable direct costs of attending college, i.e. tuition and travel from home or more difficult to measure "psychic" costs such as the effort required to succeed academically. Since I assume individuals consider future wages in making a college choice decision, all variables that I believe affect wages must be included in the college choice model.[6] The parameters of the wage model will then be identified by those variables that I think affect the decision to attend college that do not directly affect wages.

[6] In terms of the notation introduced in footnote 5, this means all variables contained in the vector X in equation 3 in the text are also in vector Z in equation 4 in the previous footnote. The Z vector in equation 4 contains additional variables that I believe affect the college choice decision only and are discussed in the text.

Identification of the model is also an important difference between the models for men and women presented here and the one in Constantine, 1995. The variables used to identify the model are mainly those that uniquely represent college costs (e.g. distance to college) and ones that may represent access and knowledge about colleges (e.g. whether a respondent's high school had a college preparatory track and percentage of seniors that go on to college). Two important changes were made from the 1995 study. First, the variables used in this model are more carefully tested and found to be good identifying variables. Second, and perhaps more important, variables which attempt to capture the "social capital"[7] used in deciding to enroll in college are included. I note these variables in my description in the next section.

IV. Data and Variable Descriptions

A. Data

The data used for this analysis are from the National Longitudinal Survey of the High School Class of 1972 (NLS 72), a survey of the high school class of 1972. There are over 22,000 respondents in the initial survey including over 3,000 black students. Respondents were surveyed four times after 1972, most recently in 1986. I use a sub- sample of blacks for which there are good hourly wage observations in 1986. There are 436 men and 756 women in this sample for a total of 1192 respondents. Most of the respondents lost are those that dropped out of the survey or were not resurveyed between 1979 and 1986. Very few are lost to unusually high or low wages.[8]

[7] Social capital as defined by Coleman (1988). It includes factors separate from human and financial capital that can affect individual productivity.

[8] Individuals with wages greater than $200 per hour or less than $1.67 were eliminated from the sample. Very few people fell outside this range. I also replicated all of the results here eliminating individuals with wages over $100 per hour. The restriction of $100 per hour only eliminates one more male respondent but six more women. The results for women are somewhat sensitive to including or excluding the very high wage respondents. For more description of the data restrictions see Constantine (1995) footnote 4.

B. Variables

Individuals are assigned to a "sector" based on whether they reported enrolling in a postsecondary institution within three years of graduating from high school, by October 1975. Students that attended no postsecondary institution are combined with those that attend a two year or vocational program to form the largest category, high school or vocational. The two other categories are students who enrolled in a four year HBCU and students who enrolled in a four year non-HBCU.[9] The variables used in the analysis can be divided into two categories: (1) characteristics of the respondent (2) characteristics of the respondent's high school or geographic region of the high school. All individual characteristics are used in the first stage college choice model and second stage wage equations since it is assumed all individual characteristics could affect wages. Some of the high school or regional characteristics are also included in the wage equations as they also affect wages (e.g. located in a state with a public HBCU), but some are used as identifying variables, that is, they affect the decision to enroll in college but not wages.

The background characteristics include: high school rank in quintiles, test scores, father's SEI index, years of mother's education, a categorical variable for family income, whether a student reported being involved in athletics in high school and whether a student thought they might major in education in college.[10]

[9] Since very few HBCUs are two year institutions, comparing black students that enrolled at HBCUs to those that enroll at any non-HBCU would be misleading, hence the four year enrollee categories. It would be most desirable to have another category for two year enrollees, but sample sizes would become very small when analyzing the data by gender.

[10] Test scores are based on a battery of tests administered along with the NLS 72 survey. SAT and ACT scores were available for some respondents, but missing for many. Since father's SEI index is thought to be a measure of permanent income, it is somewhat surprising that family income also matters for some individuals. However, family income might be a better measure of immediate resources while father's SEI index gives an indication of occupational prestige, so both variables may affect the enrollment decision in different ways. Students who participated in athletics in high schools have been found to be more likely to apply to and attend college. They are also more likely to receive financial aid (Manski and Wise 1983). Finally, planning to major in education is used

Three variables are used to describe the geographic location of the high school, whether the high school is located in a state with a public HBCU, a southern state or a city. Since every southern state has a public HBCU, the public HBCU variable completely overlaps the variable indicating a southern state.[11] Tuition at public HBCUs are lower than their white counterparts in all states hence the control for whether a student resided in a state with a public HBCU is included as a measure of financial access to a four year institution.[12] It is also an important public policy variable as it is the public HBCUs that are most likely to be influenced by legislation. A variable for southern states is included separately to capture the potentially unique situation of HBCUs in the south. Many of the public HBCUs in the south were founded as "land grant" institutions after the 1892 Plessy v. Ferguson ruling which essentially ordered southern states to provide post secondary education to blacks. Hence some southern HBCUs were conceived as a way to keep the system of higher education segregated. I use both variables in the first stage college choice model, but use only whether it was a public HBCU state in the second stage, hence being a southern state is used as an identifying variable in the model.

Two other high school related variables are included to attempt to capture the costs of attending college: (1) distance to the closest two year institution and (2) distance to the closest four year institution. It has been shown that distance to college is a good proxy for costs of attending college in general (Card 1993). Both of these variables tested well as identifying variables, hence they are used in the college choice model but not in the wage equations.

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since a large percentage of students that attend HBCUs go on to become teachers (25% of women and 12% of men in these data).

[11] The states with public HBCUs outside the South are Delaware, Ohio, Oklahoma, Pennsylvania as well as DC.

[12] Most students attend an institution in their home state. (Manski and Wise 1991). I used average tuition at public institutions in a state in early specifications of the model and it was never an important variable affecting the decision to attend college.

Four other high school related variables are included to proxy for knowledge about colleges, and possibly high school quality. They are: (1) percentage of students in the high school who are black, (2) percentage of the class of 1971 who enrolled in college (in quintiles) (3) whether the high school had a college preparatory track and (4) average family income in the high school's area (in quintiles). I use all of these variables to try and capture some of the difficult to measure factors which affect college choice. Some of these variables can be thought of as social capital as described by Coleman (1988). Coleman found there are factors, deemed social capital, which may include family or community characteristics which can affect individual productivity.[13] For example, a student may come from a low SES high school or family, but if a high percentage of students from his high school attend college, he may be more likely to attend (or with a high percentage of black students, he may be more likely to attend an HBCU).

I had no prior beliefs on which might serve as good identifying variables and tested the entire group. High school income and whether the high school had a college preparatory program turned out to directly influence wages in many specifications so they are included in the second stage wage equations. Percentage of students who are black in the high school and percentage of the previous class who enrolled in college are included in the first stage only.

V. Descriptive Statistics

A. Individual Characteristics

Table 1 describes the means of individual characteristics for men and women. It also includes hourly wages in 1986 (the log of hourly wages are used in the second stage wage equations) and measures of educational attainment by 1986. As mentioned earlier, I do not

[13] Coleman considered factors which affect the likelihood of persisting through high school. He found that coming from a single parent family and moving several times during primary and secondary schooling both greatly increased the chance of dropping out of high school, controlling for human and financial capital variables.

explicitly model degree attainment but leave it as a potential effect of HBCU attendance. It is included in this table to document the differences in degree attainment by sector. The first three columns show the means for women in each sector, the next three show men. The first striking difference is higher mean wage of women who attend HBCUs. HBCU women earned an average wage of $12.34 per hour compared to $10.80 for non-HBCU women (HBCU women had as high means wages as HBCU men). HBCU men, on the other hand, had mean wages nearly $1.00 lower than non-HBCU men. The education section shows a higher percentage of HBCU women and men earned B.A. degrees by 1986 than non-HBCU women and men, 54 vs. 46% for women, 59 vs. 51% for men. Other interesting differences between men and women can be seen in the family background variables. Whereas HBCU men do not appear to be as well off as non-HBCU men, HBCU women are at least as well off as non-HBCU women. HBCU men have a lower average father's SEI index and appear to come from families with lower income while this is not true of HBCU women.[14] However, both men and women from HBCUs have lower test scores than non-HBCU students. A high percentage of all men who enroll in four year institutions participated in athletics in high school, but 88% of HBCU attendees participated compared to 73% of non-HBCU attendees.

B. High School Characteristics

Table 2 shows the means for high school characteristics for men and women. Women who attend HBCUs appear to come from more rural areas than any other group (including men who attend HBCUs) as measured by the percentage from high schools located in cities and the distance to the nearest two and four year institution. The other important difference between

[14] Father's occupation and family income are self-reported by students.

genders is a higher percentage of HBCU women came from a college preparatory track in high schools than HBCU men (62 vs. 51%).

VI. Results

A. Reduced Form and Structural Wage Equations

Tables 3 and 4 present results of wage equations estimated via OLS. These estimates serve two purposes: (1) to estimate the effect of attending an HBCU without conditioning on the choice to attend an HBCU to see if the effect differs for men and women, and (2) if there is an effect of attending an HBCU, to see if it dissipates as structural variables, such as degree attainment, experience and occupation are added to the model. Estimates of the effect of attending an HBCU without controlling for selection would be unbiased if there are no unobservable characteristics which affect the decision to attend an HBCU which also affect wages.[15] Based on earlier work, I assume there is self-selection into possibly both college sectors thus I believe the OLS estimates are biased. However, it is interesting to consider them to judge the direction and possible magnitude of the bias.

Tables 3 and 4 show wage equations estimated separately for men and women. In each table, Column 1 is the reduced form model with no controls for college attendance. The model shown in column 2 adds a dummy variable indicating whether a respondent attended a four year HBCU. Column 3 adds controls for degree attainment. Columns 4 and 5 add more structural variables including tenure and experience in column 4 and occupation in column 5.

As shown in Table 3, the return to attending an HBCU appears to be very large for women, 23% before controlling for degree attainment. The return to receiving a B.A. is also

[15] Many studies examining the effect of college quality on wages use OLS, assuming there are no unmeasured characteristics affecting both quality of college attended and wages. (See James, et. al 1989, Black, Daniel and Smith 1995, and Turner 1997).

large ranging from 23 - 29% with experience and occupation controls. However, the return to attending an HBCU controlling for degree attainment is still large between 15 - 17%. Table 4 shows the parameter estimates for men. Unlike women, there appears to be no return to attending an HBCU for men. The returns to receiving a B.A. are statistically significant, but not as large as for women, ranging from 18 - 24%.

The results of the OLS models seem to indicate that attending an HBCU is more beneficial to women than men. It should be pointed out that attending an HBCU doesn't appear to hurt men.

B. College Choice Model

Tables 5 and 6 present the parameter estimates of the college choice model for men and women. This is the first stage estimation required to generate the variable to control for selection into each sector. In addition to generating this variable which is needed to correctly estimate wage equations, the college choice model parameter estimates indicate the factors which influence black students in the decision to enroll in a four year college sector. Two sets of estimates are presented: (1) multinomial logit parameter estimates in Table 5 and (2) the marginal effect of the variables on the probability of being in each sector, evaluated at the means, presented in Table 6.

The magnitude of the parameter estimates in Table 5 do not have a good direct interpretation.[16] However, the reference sector is the four year non-HBCU sector so all parameter estimates are estimates of the probability of being in the high school or four HBCU sector, relative to the probability of being in the four year non-HBCU sector. Hence the sign and

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However, others have found that it is important to control for selection into the sector or instrument for background characteristics (see Brewer and Ehrenberg, 1996 and Behrman et. al 1996)

[16] From Greene 1993, the probability of being in any sector is Prob $(Y=j) = \varepsilon^{Bjxi} / 1 + \sum\varepsilon^{Bjxi}$ for j = 1, 2 …J. The probability of being in one sector is then normalized to zero and all other probabilities are relative to the normalized or "reference" sector.

statistical signifigance of the estimate can be easily interpreted. For example, as shown in columns 1 and 2 for men, being an athlete in high school decreases the probablity a man chooses the no college or two year college sector compared to the four year non-HBCU sector. Being an athelete also increases the probability he will choose the HBCU sector over the non-HBCU sector.

Column 2 in Table 5 shows the estimates for the HBCU sector for men and column 4 shows them for women. A very interesting pattern emerges from these estimates. The variables which affect the probability of men choosing the HBCU sector over the non-HBCU sector are: being an athlete in high school (positive), percentage of students in high school who are black and percentage who enroll in college (positive), having a college preparatory track in high school (negative), being in a public HBCU state and being far away from a four year college (positive). Most of these variables were included to try and capture the cost of attending an HBCU. HBCU men appear to be heavily influenced by costs and perhaps given the college preparatory result more vocationally oriented.

The results for women, shown in column 4 are quite different. Many of the variables designed to capture costs are not important factors in the decision to attend an HBCU (i.e. athlete and distance to a four year college) and living in a public HBCU state has a much smaller and somewhat weaker effect than for men. Living in a southern state has a positive effect. However, high test scores make it much less likely a woman will choose an HBCU, while a high percentage of black students, a college preparatory program and a high percentage of students enrolling in college from their high school all increase the probability that a women enrolls at an HBCU. Women who choose HBCUs appear to be from fairly academically oriented high schools, are not as influenced by cost concerns as men, and are heavily influenced by test scores. Except for low

test scores, HBCU women may be quite academically oriented and come from a tradition of high schools which send people to HBCUs.

Although the parameter estimates support many beliefs held about why students choose HBCUs over non-HBCUs, separating the sample by gender reveals sharp differences in which variables influence men and women. Ever since black students have had the realistic option of enrolling in non-HBCUs, it has been believed non-HBCUs have prohibitively high admission standards and costs for many students. The finding that men are more heavily influenced by costs and women by test scores is new and intriguing. The variables designed to capture social capital, the percentage of black students in a high school and the percentage who enroll in college influence both men and women. These variables may be capturing some of the factors that influence college choice beside admission requirements and costs.

The marginal effects of the variables on the probability of enrolling in the four year HBCU and non-HBCU sectors only are shown in Table 6. The parameter estimates in this table show the marginal effect each variable has on the probability of simply being in each sector or not. For example, as shown in columns 1 and 2, every 10 point increase in test scores increases a man's chance of being in the HBCU sector by 2%, the non-HBCU sector by 3%, and by definition decreases the chance of being in the high school or two year sector by 5%. The results for HBCU men reinforce the belief they are more financially constrained and less academically oriented than either men at non-HBCUs or women. Test scores matter for both sectors but they are more important in the non-HBCU sector. High school rank does not affect the probability of enrolling in an HBCU, a fairly amazing finding for four year institutions. Living in a state with a public HBCU and being an athlete in high school both increase the probability of choosing the HBCU sector a great deal, 18% and 16%. The presence of a college preparatory track in high school has

a positive effect on the probability of enrolling in the HBCU sector, but it is not as large as the effect in the non-HBCU sector (9% vs. 22%).

The marginal effects for women, shown in columns 3 and 4 reveal quite different patterns. High school rank has a positive effect on the probability of enrolling in an HBCU, but it is smaller than in the non-HBCU sector (3% vs. 6%). High test scores actually appear to have a negative effect on the probability of choosing an HBCU. Again, this is fairly surprising for a four year institution. The marginal effects support the notion that women are much less financially constrained then men. Father's SEI index and family income both increase the probability of being in the HBCU sector and they have no effect in the non-HBCU sector. Distance to the nearest two year and four year institution both have a positive effect on the probability of being in the HBCU sector.

The results in Table 6 also suggest an important effect of HBCUs is to pull black students into the four year HBCU sector. The presence of a public HBCU in the state increases a black male's chances of enrolling in an HBCU by 18% and decreases his chances of not enrolling in a post-secondary institution or enrolling in only a two year institution by 19%. For women, being far away from a two year college makes it more likely a student chooses a four year HBCU. Hence, one extremely important effect of public HBCUs in particular may be to pull black students out of the no college or two year college sector and into the four year sector. In addition to better persistence at four year HBCUs, they may increase a student's chances of getting a B.A. by simply making it possible to enroll in a four year institution after high school.[17]

C. Selection Corrected Wage Equations and Predicted Wages

[17] This hypothesis has been further tested in a forthcoming study by Ehrenberg, Rothstein and Olsen. They find that the presence of HBCUs pulls students out of the two year and four year non-HBCU sector into the four year

The results of the reduced form wage equations are shown in Table 7. Reduced form wage equations can be used to calculate the "treatment" effect of attending an HBCU by comparing predicted wages from the corrected and uncorrected wage equations. Columns 1 and 2 show the selection corrected wage equations for men in the HBCU and non-HBCU sectors. The only significant selection for men occurs in the HBCU sector and it is large, -39%.[18] The negative coefficient implies that the unobservable characteristics that caused an individual to choose an HBCU (over their next most likely sector) are ones that would cause lower wages, e.g. lower innate ability or poorer elementary or secondary training. The results for women, once again, are quite different. The only significant selection occurs in the non-HBCU sector. It is also large, -32% and significant at the 5 % level. It seems as if it is the non-HBCU women who have unobservable characteristics which negatively impact their wages. While it is not surprising, given their mean wages, to find no negative selection in the HBCU sector for women, the large negative selection into the non-HBCU sector is surprising. It essentially indicates the lower wages of non-HBCU women are not due to attending a non-HBCU. These results certainly do not indicate the parameter estimate for attending an HBCU from the OLS wage equations for women is biased downward.

A measure of the effect of attending an HBCU is to compare predicted wages (evaluated at the means) for all individuals in the four year college sectors. Three calculations of predicted wages are made. The first is simply an OLS estimate of the reduced form wage equations with no correction for college choice (i.e. the model shown in Tables 3 and 4, column 1, estimated for each college sector). Since I found statistically significant selection for both men and women, the

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sector. They do not find an increase in overall post secondary enrollment, but a net increase in four year enrollment.

simple OLS predictions are not likely to be most accurate. I also calculate predicted wages based on the model shown in Table 7, (equation 3 in the text) that is, conditional on the college sector chosen. Finally, I include a calculation using the coefficients from equation 3, but leaving out the coefficient for the selection term, lambda. As detailed in Gyourko and Tracy (1988), this calculation (which I refer to as "random assignment") is equivalent to randomly assigning an individual from the college population to each sector. Since we leave out the selection term, it captures the varying returns to the observable characteristics only. Whereas predicted wage conditioned on college choice are the best estimates of the effect of HBCU attendance on wages, the random assignment experiment gives an indication of potential returns to observable characteristics in each sector. Both calculations are of interest from a public policy standpoint.

Table 8 shows the results of the various wage calculations for men and women. The OLS uncorrected predicted wages for men are $10.07 in the HBCU sector and $10.62 in the non-HBCU sector, a difference of -5.5%, very close to the difference in actual means in Table 3. However, using the model which controls for selection into each sector, the HBCU wage rises to $11.60 per hour and the non-HBCU wage to $10.78 per hour, a difference of +7%. This implies that the uncorrected, OLS estimate of the effect of HBCU attendance on wages of black men is understated. At least for men with mean characteristics, there is a gain to wages from attending an HBCU.[19] The wages predicted based on observable characteristics for individuals randomly assigned to reach sector are $17.03 for HBCU men compared to $12.74 for non-HBCU men a large difference of +25%. These results suggest that not only do the men who actually choose the

[18] It is only significant at the 15% level which is partially a function of trying to estimate a two stage model on a fairly small sample.

[19] This formula could be used to calculate the difference for a man with specific characteristics also, e.g. from the South, from a mostly white high school who was not an athlete.

HBCU sector benefit in terms of wages, there could be substantial gains to other men if they chose to attend an HBCU.

Once again, the results for women are different than those for men. The difference in predicted wages from the OLS model is 15%, close to the difference in actual means wages. Predicted wages based on the selection corrected model are nearly identical to those from the OLS model, $9.90 for HBCU women and $8.39 for non-HBCU women, a difference of 15%. Predicted wages based on observable characteristics for women randomly assigned to the HBCU sector would average $11.22 while they would be $11.74 for non-HBCU women. Hence, the wage gains for HBCU women come from returns to their unobservable characteristics. That is, women who choose to attend HBCUs are precisely those that benefit most. This is not an uncommon result.[20]

VII. Conclusions

As mentioned in the relevant literature, very little research has been done examining what happens to men and women at HBCUs. The results from this study indicate that the general boost to wages from HBCU attendance found in a previous study is attributed more to men. Women who attend HBCUs do benefit in terms of wages, but this study indicates women who choose HBCU are those most likely to benefit, that is there are unobservable (or difficult to measure) characteristics of these women that generate higher wages. The benefits to men may be more general as returns to even their observable characteristics are higher from attending an HBCU. Flemming's hypothesis about what occurs to men and women on HBCU and non-HBCU campuses could support these findings. Black men may experience a positive transformation on the supportive HBCU campuses.

Since neither men nor women lose ground from attending an HBCU, attending an HBCU can be a good choice for any group of black students. Given their relative lack of resources, they are providing a relatively less expensive and academically accessible vehicle to four year degrees and labor market success. However, the difference in the gains in terms of wages, to black men and women from attending HBCUs is surprising and intriguing. Further research is needed in two areas. First, this analysis is being updated for students who attended college in the 1980s. If differences for men and women persist, they should be examined more fully. The 1980s and early 1990s were a time of declining and then increasing enrollments at HBCUs, it would be interesting to see if there have been any corresponding changes in the return to attending an HBCU. Second, the results of this study indicate we should be cautious of any study on the effect of college attendance that does not consider men and women's experiences separately. This study has also reinforced the important role HBCUs play in providing access to a four year institution for black students in addition to their success in preparing students for the labor market.

[20] Rosen and Willis (1979) found this same result with respect to individuals who choose to attend college in general.

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Table 1
Means for Individual Characteristics, by Gender
(standard deviations)

	Sector by 1975					
	Women			**Men**		
	High School or vocational	**Four Year HBCU**	**Four Year Non-HBCU**	**High School or vocational**	**Four Year HBCU**	**Four Year Non-HBCU**
	(N=439)	**(N=147)**	**(N=170)**	**(N=272)**	**(N=70)**	**(N=90)**
Hourly wage in 1986	8.37 (12.8)	12.34 (14.9)	10.8 (13.8)	8.86 (5.6)	12.24 (11.5)	13.2 (13.3)
Characteristics in 1972						
Test scores	166.0 (23.5)	181.2 (25.2)	192.9 (28.4)	158.5 (25.3)	188.4 (24.9)	196.8 (30.2)
High school rank, percentile	.45 (.25)	.63 (.27)	.67 (.26)	.35 (.24)	.57 (.22)	.55 (.27)
Father SEI index	24.31 (17.4)	34.58 (23.9)	32.14 (21.7)	25.4 (18.0)	33.0 (26.0)	34.8 (21.9)
Mother's years of education	11.2 (1.6)	11.8 (2.0)	12.0 (1.92)	11.2 (1.6)	12.1 (1.9)	12.0 (2.1)
Family income < $3000	.27 (.45)	.25 (.43)	.20 (.40)	.24 (.42)	.20 (.41)	.20 (.40)
Family income $3000 - $6000	.29 (.46)	.22 (.42)	.27 (.44)	.28 (.45)	.26 (.44)	.18 (.39)
Family income $6000 - $9000	.26 (.44)	.24 (.43)	.20 (.41)	.24 (.42)	.19 (.39)	.23 (.42)
Family income $9000 - $12000	.10 (.30)	.13 (.34)	.18 (.39)	.16 (.37)	.20 (.41)	.13 (.34)
Family income > $12000	.06 (.24)	.16 (.36)	.15 (.36)	.09 (.28)	.15 (.36)	.26 (.44)
Athletics in high school	.30 (.46)	.42 (.50)	.41 (.49)	.61 (.49)	.88 (.32)	.73 (.44)
Plan to major in education	.25 (.44)	.35 (.48)	.31 (.47)	.17 (.38)	.17 (.38)	.17 (.38)
Education by 1986						
High school or vocational degree	.68 (.47)	.18 (.38)	.16 (.37)	.70 (.46)	.16 (.37)	.09 (.28)
Some college, no degree	.23 (.42)	.27 (.45)	.38 (.49)	.22 (.42)	.23 (.42)	.38 (.49)
Two year degree	.05 (.23)	.01 (.08)	.01 .(08)	.04 (.20)	.03 (.17)	.02 (.45)
B.A. or advanced degree	.03 (.18)	.54 (.50)	.46 (.50)	.03 (.18)	.59 (.50)	.51 (.50)

Table 2
Means for High School Characteristics by Gender
(standard deviations)

	Sector by 1975					
	Women			**Men**		
	High School or vocational (N=439)	**Four Year HBCU (N=147)**	**Four Year Non-HBCU (N=170)**	**High School or vocational (N=272)**	**Four Year HBCU (N=70)**	**Four Year Non-HBCU (N=90)**
Characteristics in 1972						
Southern State	.67	.86	.48	.68	.86	.51
	(.47)	(.34)	(.50)	(.47)	(.35)	(.50)
Public HBCU State	.77	.92	.61	.74	.94	.60
	(.42)	(.27)	(.49)	(.44)	(.23)	(.49)
City	.45	.39	.53	.35	.47	.45
	(.50)	(.39)	(.50)	(.48)	(.50)	(.50)
Miles from a junior	15.3	20.9	15.1	16.7	19.9	15.3
College	(20.8)	(26.1)	(22.8)	(22.4)	(23.1)	(15.1)
Miles from a four year	14.3	17.5	11.1	16.5	15.8	9.0
college	(18.5)	(19.9)	(20.0)	(19.5)	(18.2)	(12.2)
Percent students black	.57	.61	.54	.51	.62	.47
	(.34)	(.32)	(.34)	(.33)	(.29)	(.33)
Students that went on to	2.5	2.8	2.7	2.60	2.74	2.67
college in 1971, quintile	(.96)	(1.0)	(1.0)	(.91)	(.97)	(1.1)
Percent with college prep.	.19	.62	.61	.16	.51	.63
program	(.39)	(.39)	(.49)	(.37)	(.50)	(.49)
High school income,	2.63	2.58	2.77	2.60	2.54	2.87
quintile	(.75)	(.71)	(.68)	(.65)	(.63)	(.82)

Table 3
Reduced Form and Structural OLS Wage Equations, All Women
(Standard errors)

	(1)	(2)	(3)	(4)	(5)
Intercept	1.08**	1.05**	1.12**	.99**	.95**
	(.25)	(.25)	(.25)	(.24)	(.24)
background variables					
high school rank, quintile	.04**	.04*	.02	.01	.004
	(.02)	(.02)	(.02)	(.02)	(.02)
test scores (coefficient *10)	.015	.02*	.01	.01	.01
	(.01)	(.01)	(.01)	(.01)	(.01)
athlete in high school	.09**	.09*	.09**	.09**	.08*
	(.05)	(.05)	(.05)	(.04)	(.04)
planning education major	.15*	.14*	.14*	.10	.08
	(.08)	(.08)	(.08)	(.08)	(.08)
attended an HBCU	----	.23**	.15**	.17**	.16**
		(.05)	(.06)	(.06)	(.06)
Education by 1986					
some college	---	---	.09*	.07	.07
			(.05)	(.06)	(.05)
two year degree	---	---	.16	.13	.11
			(.11)	(.11)	(.11)
BA or more	---	---	.29**	.27**	.23**
			(.06)	(.06)	(.06)
other family background	Yes	Yes	Yes	Yes	Yes
high school variables	Yes	Yes	Yes	Yes	Yes
tenure and experience	No	No	No	Yes	Yes
occupation controls	No	No	No	No	Yes
adjusted R^2	.09	.11	.13	.19	.19

Estimates based on sample of 756 individuals with hourly wages in 1986. See notes for Table 5

** - significant at the 5% level
* - significant at the 10% level

Table 4
Reduced Form and Structural OLS Wage Equations, All Men
(Standard errors)

	(1)	(2)	(3)	(4)	(5)
Intercept	1.21**	1.24**	1.28**	.92**	1.03**
	(.29)	(.30)	(.30)	(.30)	(.30)
background variables					
high school rank, quintile	.11**	.11**	.10**	.09**	.08**
	(.03)	(.03)	(.03)	(.03)	(.03)
test scores (coefficient *10)	.01	.01	.01	.01	.01
	(.01)	(.01)	(.01)	(.01)	(.01)
athlete in high school	.10*	.09	.07	.07	.05
	(.06)	(.06)	(.06)	(.06)	(.06)
planning education major	.06	.06	.08	.08	.09
	(.13)	(.13)	(.13)	(.13)	(.13)
attended an HBCU	----	.04	-.01	.01	-.03
		(.07)	(..08)	(.08)	(.07)
Education by 1986					
some college	---	---	.03	.03	.02
			(.06)	(.06)	(.06)
two year degree	---	---	.12	.07	.01
			(.14)	(.14)	(.14)
BA or more	---	---	.18**	.24**	.17**
			(.08)	(.08)	(.08)
other family background	Yes	Yes	Yes	Yes	Yes
high school variables	Yes	Yes	Yes	Yes	Yes
tenure and experience	No	No	No	Yes	Yes
occupation controls	No	No	No	No	Yes
adjusted R^2	.12	.12	.12	.17	.21

Estimates based on sample of 436 individuals with hourly wages in 1986. See notes for Table 5

** - significant at the 5% level
* - significant at the 10% level

Table 5
Parameter Estimates for Model of College Choice, Men and Women

	Sector by 1975			
	Men		Women	
	(1) High School or Vocational	(2) Four year HBCU	(3) High School or Vocational	(4) Four year HBCU
Individual Characteristics				
High school rank, quintiles	-.54**	.03	-.46**	-.13
	(.17)	(.20)	(.13)	(.14)
Test scores	-.03**	-.003	-.01**	-.02**
	(.01)	(.01)	(.007)	(.01)
Father's SEI	-.02*	-.01	-.01*	.01
	(.01)	(.01)	(.007)	(.01)
Mother's education	-.17**	.07	-.15**	-.02
	(.08)	(.10)	(.07)	(.07)
Family income	.02	.04	.01	.17
	(.14)	(.16)	(.11)	(.12)
Athlete in high school	-.75**	1.07**	-.35	.12
	(.38)	(.53)	(.25)	(.28)
planning education major	.41	-.03	-.14	.36
	(.76)	(.75)	(.42)	(.38)
High School Characteristics				
High school in South	.07	.76	.24	1.43**
	(.61)	(.70)	(.41)	(.50)
percent students black,	.19	.43**	.10	.26**
quintile	(.17)	(.19)	(.11)	(.12)
students that went on to	.43**	.31#	.08	.29**
college in 1971, quintile	(.20)	(.21)	(.14)	(.15)
Percent with college prep	-1.94**	-.61#	-1.3**	.58**
program	(.36)	(.42)	(.26)	(.29)
high school income, quintile	-.61**	-.31	-.18	-.15
	(.27)	(.29)	(.17)	(.19)
High school in city	-.06	.56	.04	.03
	(.61)	(.51)	(.30)	(.34)
Public HBCU State	-.20	1.88**	.40	.86#
	(.62)	(.89)	(.42)	(.57)
Miles from a junior College	-.01	-.004	-.01*	.003
	(.01)	(.01)	(.006)	(.01)
Miles from a four year	.04**	.03**	.002	.01
college	(.02)	(.02)	(.008)	(.01)

Based on a sample of 436 individuals for men and 756 for women. Comparison group for parameter estimates is four year n-HBCU.

** - significant at the 5% level
* - significant at the 10% level
# - significant at the 15% level

Table 6
Marginal Effects from College Choice Model, Men and Women

	Men		Women	
	(1)	**(2)**	**(3)**	**(4)**
	Four year HBCU N=70	**Four Year Non-HBCU N=94**	**Four year HBCU N=147**	**Four year Non-HBCU N=170**
Individual Characteristics				
High school rank, quintiles	.04	.05**	.03**	.06**
	(.04)	(.02)	(.015)	(.02)
Tests scores (*10)	.02**	.03**	-.01#	.02**
	(.01)	(.01)	(.008)	(.01)
Father's SEI (*10)	.01	.02*	.02**	.01
	(.01)	(.01)	(.01)	(.01)
Mother's education	.02**	.02**	.013#	.02**
	(.008)	(.01)	(.009)	(.01)
Family income	.002	-.003	.02#	-.01
	(.01)	(.02)	(.01)	(.02)
Athlete in high school	.16**	.06	.05*	.04
	(.05)	(.05)	(.03)	(.04)
planning education major	-.04	-.04	.06	.01
	(.07)	(.09)	(.05)	(.06)
High School Characteristics				
High school in South	.05	-.03	.17**	-.07
	(.06)	(.07)	(.07)	(.06)
percent students black,	.03*	-.02	.02*	-.02
quintile	(.02)	(.02)	(.01)	(.02)
students that went on to	.01	-.04*	.03*	-.02
college in 1971, quintile	(.02)	(.02)	(.02)	(.02)
Percent with college prep	.09**	.22**	.21**	.14**
program	(.04)	(.05)	(.03)	(.04)
high school income, quintile	.02	.07**	-.002	.03
	(.03)	(.03)	(.02)	(.03)
High school in city	.05	-.01	-.00	-.01
	(.04)	(.05)	(.04)	(.04)
Public HBCU State	.18**	.01	.07	-.08
	(.07)	(.07)	(.07)	(.06)
Miles from a Junior College	.006	.01	.02**	.01#
(*10)	(.007)	(.01)	(.007)	(.008)
Miles from a four year	-.006	-.05**	.013#	-.005
college (*10)	(.01)	(.02)	(.009)	(.01)

** - significant at the 5% level
* - significant at the 10% level
# - significant at the 15% level

Table 7

Selection Corrected Reduced Form Wage Equations for College Sectors, Men and Women (Standard Errors)

	Men		Women	
	(1) Four Year HBCU (N=70)	(2) Four Year Non-HBCU (N=94)	(3) Four Year HBCU (N=147)	(4) Four Year Non-HBCU (N=170)
Intercept	3.97**	.99	.77	2.46**
	(1.26)	(.74)	(.72)	(.68)
High school rank,	.15	.17**	.08#	.01
quintiles	(.11)	(.06)	(.05)	(.04)
tests scores (*10)	-.007**	.03	.05#	-.02
	(.003)	(.02)	(.03)	(.02)
Father's SEI (*10)	.038*	.03	-.03	-.02
	(.02)	(.03)	(.02)	(.02)
Mother's education	-.04	-.01	.00	-.01
	(.04)	(.03)	(.03)	(.02)
Family income	.18**	-.02	.06	.11**
	(.05)	(.04)	(.05)	(.04)
Athlete in high school	.004	-.03	.18#	.07
	(.29)	(.14)	(.11)	(.07)
planning education	-.24	.33*	.38**	-.06
major	(.22)	(.19)	(.18)	(.09)
High school in city	-.20	.33**	-.03	.04
	(.15)	(.13)	(.11)	(.08)
Percent with college	.15	-.01	.20	.001
prep program	(.17)	(.14)	(.16)	(.09)
high school income,	.11	-.01	.03	-.01
quintile	(.12)	(.08)	(.07)	(.06)
Public HBCU State	-.57#	.03	-.11	.01
	(.39)	(.15)	(.21)	(.11)
Lambda	-.39#	-.17	-.12	-.32**
	(.26)	(.17)	(.19)	(.14)
adjusted R^2	.08	.15	.06	.07

** - significant at the 5% level
* - significant at the 10% level
# - significant at the 15% level

Table 8
Difference in Predicted Wages for Four Year College Attendees, Men and Women

	Men			Women		
	OLS Estimates	Corrected Estimates	Random Assignment	OLS Estimates	Corrected Estimates	Random Assignment
HBCU hourly wage	$10.07	$11.60	$17.03	$9.65	$9.90	$11.22
Non-HBCU hourly wage	$10.62	$10.78	$12.74	$8.21	$8.39	$11.74
Ln Wage Difference	-.05	.07	.29	.16	.16	-.045
Difference as percent of HBCU wage	-5.5%	7%	25%	15%	15%	-4.6%