

Does the River Spill Over?

Estimating the Economic Returns to Attending a Racially Diverse College

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Abstract

Supreme Court justice Lewis Powell, ruling in *Regents of the University of California v. Bakke* in 1978, argued for the continued use of race as a factor in college admissions on the grounds that a diverse student body improved the quality of college education. Surprisingly, the academic literature contains few rigorous tests of Powell's hypothesis. This paper evaluates the hypothesis that students receive benefits from attending a diverse college, using postgraduate labor market outcomes and life satisfaction measures. We analyze both the effect of attending a diverse college and selecting a racially diverse major within a college. The latter strategy allows us to control for both college and major fixed effects. We find no effect of collegiate diversity on an individual's productivity or life satisfaction.

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“[T]he attainment of a diverse student body ... is a constitutionally permissible goal for an institution of higher education. ... The atmosphere of ‘speculation, experiment and creation’ - so essential to the quality of higher education - is widely believed to be promoted by a diverse student body.”

–Lewis Powell, Regents of the University of California v. Bakke (438 U.S. 265, 1978, pp. 311-312, quoting Sweezy v. New Hampshire, 354 U.S. 234, 1957, p.263)

1 Introduction

In his concurring opinion that set the parameters for racial preferences in college admissions after 1978, Supreme Court Justice Lewis Powell assumes that racial diversity improves the quality of higher education. Powell cites no direct evidence on this hypothesis, referring instead to “widely” held beliefs on the subject. Twenty-five years after Powell wrote his concurring opinion, as the Supreme Court prepares to revisit the question of racial preferences in college admission, the lack of published research on the subject of diversity and college quality is astounding. An accurate assessment of the impact of collegiate diversity on later outcomes for graduates would surely be of value to those questioning the appropriateness of continuing racial preferences in admissions. Such an assessment would also improve efforts to analyze the prospective impact of removing affirmative action programs.¹

While some research has touched on the subject of classroom racial composition and the quality of education at the primary or secondary levels (Rivkin 2000, Hanushek et al. 2001, Hoxby 2000), none of these studies provide any evidence consistent with the hypothesis that racial diversity improves education. Indeed, most existing studies report

¹For example, Arcidiacono (2002) estimates a model of college applications, school acceptance and financial aid decisions, the choice of major, and earnings to simulate how affirmative action in admissions and financial aid affects expected earnings for blacks. However, he assumes that diversity plays no role in the education decision-making of blacks or whites. If diversity improves one’s undergraduate education, estimates of the changes in decision-making due to the removal of affirmative action will be incorrect.

adverse effects of racial or ethnic diversity on a host of outcomes (see, for example, Alesina et al. 1999; Alesina and La Ferrara 2000, 2001; Easterly and Levine, 1997; Gugerty and Miguel 2002; Vigdor 2001; see Arcidiacono and Vigdor 2002 for a notable exception). Previous work analyzing the impact of diversity in higher education has generally not focused on the outcome measures usually associated with the literature on college quality, such as postgraduate earnings, and has relied primarily on correlational evidence (Bowen and Bok, 1998; Gurin 1999).

We begin by offering a moderate formalization of Powell’s hypothesis. Building on the existing concepts of human capital (Becker 1964), social capital (Glaeser et al., 2000; Putnam, 2000) and ethnic capital (Borjas, 1992, 1995), we introduce the concept of “diversity capital.” Put simply, diversity capital is a stock measure of an individual’s ability to create surplus in interactions with individuals of different backgrounds, whether ethnic, racial or socioeconomic. Diversity capital is generated through repeated interaction with individuals of different backgrounds. In this context, Powell’s hypothesis translates into a belief that a diverse student body contributes to diversity capital.

To test the hypothesis that diversity increases the quality of undergraduate education, we make use of the College and Beyond dataset, the same source used in Bowen and Bok’s (1998) study of the impact of affirmative action and Dale and Krueger’s (2002) analysis of the returns to attending a more selective college. This dataset examines the cohort that entered one of 30 selective colleges in the fall of 1976, and includes both comprehensive institutional records on the student body and a follow-up survey administered to a sample of the cohort in 1996. The data provide a unique opportunity to examine the relationship between undergraduate cohort diversity and post-graduation outcomes.

The racial composition of a college’s student body may be correlated with a number of less easily observed measures of peer or institution quality. To address these serious concerns, we present the results of a number of specifications that examine the racial composition of cohorts at the major-by-college level, controlling for both major and

college fixed effects. These specifications test whether engineering majors, for example, attain superior postgraduation outcomes when the cohort of engineering majors at their college is more racially diverse *relative to the college-wide average* than other cohorts of engineering majors.

We use several methods to infer the quality of an individual's undergraduate education. Following existing literature on the subject (Behrman et al. 1996; Behrman, Rosenzweig and Taubman, 1996; Brewer et al. 1999; Dale and Krueger 2002), we focus considerable attention on earned income as an outcome measure. We also consider graduation and the attainment of postgraduate degrees as outcome measures. Finally, we borrow from a growing strand of economics literature that examines life satisfaction measures (Clark and Oswald, 1994; Di Tella et al. 2001; Gruber and Mullainathan, 2002).

In addition to directly testing the link between student body racial composition and outcomes, we present the results of analyses that compare outcomes for individuals who make different assessments of their undergraduate experience's contribution to their diversity capital. Our ability to conduct this analysis derives from a series of survey questions that asked respondents to judge their college's contribution to fourteen separate qualities that can be considered components of human capital.

We interpret the results, presented in Section IV below, as generally inconsistent with the hypothesis that racial diversity improves college quality. Across all of our empirical specifications, we fail to record a single instance where collegiate diversity, at either the institution or major level, exerts a positive influence on the outcome measure considered. Moreover, we consistently find that individuals who feel that their undergraduate experience enhanced their diversity capital fare worse than those who felt they received no such benefits, holding constant thirteen other subjective measures of college's contribution to human capital. Faced with this evidence, we conclude that the "widely [held beliefs]" cited by Justice Powell cannot be empirically corroborated at elite institutions.

The one other paper which has tested the Powell hypothesis is Daniel, Black, and Smith (2001).² They find that a higher percentage of black students has a *positive* relationship with earnings, a relationship that holds under a number of specifications where the endogeneity of college choice is dealt with using selection on observables. The difference in results can be attributed to two sources. First, their analysis relies only on variation in percentage black at the college level. Controlling for the averages SAT scores of the school, a higher percentage black implies a more aggressive affirmative action program. With higher quality colleges having more aggressive affirmative action programs, a higher percentage black may be picking up the causal effect of an unobserved quality measure. Second, we focus only on elite schools; the only place where affirmative action in admissions is relevant (Kane 1998).³ In addition to elite schools being a highly selected sample of very motivated students, elite schools also tend to have very aggressive affirmative action policies which lead to tremendous gaps in ability levels across racial groups. Hence, should interactions occur within ability groupings, increases in racial diversity will not lead to increases in diversity capital.

2 Interpreting Powell: Diversity Capital

Economists liken individuals' decisions to enroll in educational institutions as investment decisions. As with any investment decision, individuals face costs when they choose to acquire education, and receive a return on these costs. In the standard model, each individual chooses to acquire additional education if and only if the present value of expected future returns from their up-front investment exceed those available in other asset markets. The asset acquired in the education decision is usually referred to as human capital (Becker, 1964).

Lewis Powell's argument that diversity promotes an "atmosphere of 'speculation experiment and creation... essential to the quality of higher education'" can thus be

²A more detailed explanation of their methodology is given in Daniel, Black, and Smith (1997).

³Daniel, Black, and Smith (2001) use data from the National Longitudinal Survey of Youth.

translated into a hypothesis that the effect of college education on an individual's stock of human capital depends on the degree of racial diversity at the university where the education takes place. In this section, we develop this notion in a simple model that makes two presumptions beyond Powell's assertion. First, we presume that the component of human capital influenced by racial diversity is a distinct quantity, which we refer to as diversity capital. Second, we presume that the returns to diversity capital accrue when individuals are forced to interact with persons of different racial backgrounds in the marketplace.

The concept of diversity capital is similar in some respects to Borjas' (1992) formulation of "ethnic capital." Borjas argues that an individual's human capital is positively influenced by the average level of human capital in that individual's ethnic group. The mechanism for this transmission is the sharing of "social, cultural and economic factors" (p.126) within groups. In subsequent work, Borjas (1995) and Cutler et al. (forthcoming) show that the degree of ethnic capital transmission depends on the concentration of ethnic groups within the population. Our conceptualization of "diversity capital" is similar, in the sense that the importance of this measure depends on the relative composition of a community. We will also show that individuals are generally better off when the level of diversity capital in their community is higher. The principal difference between our construct and ethnic capital is that our measure is defined at the individual level, while ethnic capital is by definition a group-level characteristic.

Our model is a variation on Glaeser (1999). We envision a simple discrete-time model where individuals i , each belonging to exactly one group j , interact in pairs each period. Interactions generate some level of surplus and are determined at random. When two members of the same group interact, the amount of surplus generated is constant, normalized to one. When members of different groups interact, the amount of surplus depends on the amount of diversity capital D_i , possessed by each individual.

The sole means of accumulating diversity capital is through interactions with members of different groups, implying that individuals begin life with none. An individual

member of group j , which comprises a share $0 < \theta_j < 1$ of the overall population, can thus expect to receive a surplus of

$$E(S) = \theta_i + (1 - \theta_i)f(D_i, D_{\sim j}) \quad (1)$$

where $D_{\sim j}$ is the average diversity capital of members of groups other than j and $f(D_i, D_{\sim j})$ is the function mapping diversity capital into surplus and is strictly increasing in both of its arguments.

In accordance with this model, the justification for promoting racial diversity in higher education is that it permits individuals to accumulate diversity capital at an early stage in their lives, which leads to higher output in later periods. It is clear from this model that individuals making private decisions to invest in diversity capital will generally choose too low an investment level from society’s perspective. This occurs because diversity capital has the potential to generate positive externalities. When one participant in a transaction possesses diversity capital, the total amount of surplus in the transaction increases. Positive externalities to diversity capital exist when the possessor of diversity capital fails to capture all the returns to it.

The Powell hypothesis, then, is an argument that greater diversity in higher education is preferable for efficiency reasons. This stands in direct contrast to the traditional equity-based argument that diversity is preferable as restitution for past discrimination. The remainder of this paper is an empirical exercise which attempts to measure whether attending a diverse college increases “diversity capital” and whether there are appreciable returns to that form of capital.

3 Data and Methods

To examine the impact of collegiate diversity on postgraduate outcomes, we employ the College and Beyond Dataset, made available by the Andrew W. Mellon Foundation.⁴

⁴We omit observations from historically black colleges as affirmative action is not relevant at these schools.

This dataset contains information from two sources: administrative information a set of mostly selective undergraduate institutions, and survey responses collected from a sample of students who matriculated at those institutions in one of four cohorts. Our analysis focuses on the 1976 entering cohort, a group that was enrolled at the time of the Supreme Court’s *Bakke* decision.⁵ The administrative data includes information on each matriculant’s SAT scores, a student’s major, and the eventual outcome, whether graduation, transfer, or withdrawal. For most institutions, the administrative data represents the entire cohort. For the remainder, the data comprise a nonrandom sample of the student body. We use sample weights to adjust for this sampling. A complete list of institutions represented appears in Appendix table A1. All individuals in the administrative data were surveyed in 1996 with a response rate of around 80%. This survey provides information on many of the outcomes of interest such as earnings and life satisfaction.

Our most basic econometric strategy is to regress outcome measures related to earnings, postgraduate education outcomes, employment and life satisfaction on variables capturing a graduate’s own ability as measured by SAT scores, undergraduate peer ability as measured by mean cohort SAT scores, and the share of “under-represented” minorities in the undergraduate cohort. An under-represented minority belongs to a group whose share of the college graduate population is lower than their overall population share: African-Americans, Hispanics, and Native Americans. Whites and Asian-Americans comprise the rest of the sample. While we focus on outcomes for whites and Asian-Americans, the results are similar for under represented minorities as well.⁶

⁵Other cohorts available in the C&B data set include the classes entering in 1951 and 1989. We omit the 1951 cohort since minority enrollment were universally small at that point in time. We omit the 1989 cohort sine the 1996 follow-up survey found a significant fraction who had not yet completed their post-graduate education in 1995.

⁶Since the predictions of the model suggest that under-represented minorities should benefit more from a larger percentage of whites and Asian-Americans, it is inappropriate to pool the results for the two groups. We assume that Asian-Americans and whites are sufficiently integrated at the high school

The histogram in Figure 1 shows the extent to which under-represented minority (URM) share varies in our sample. Roughly one-third of students in our sample attend a university where the URM share is less than two percent. A considerable number experience URM shares in excess of 6%, while the most diverse institutions enrolled over 13% URM students in 1976.

A representative regression equation is thus:

$$Y_{ij} = \beta_1 X_i + \beta_2 SAT_j + \beta_3 URM_j + \epsilon_{ij} \quad (2)$$

where Y_{ij} represents an outcome measure for graduate i who attended college j , X_i is a vector of personal characteristics including race, gender, and SAT scores, SAT_j is a measure of peer SAT scores, and URM_j is the share of under-represented minorities in the cohort matriculating at college j .

The hypothesis that increasing collegiate diversity contributes to the formation of diversity capital hinges on the impact of increased diversity on interracial interaction. The effect of increasing URM share on interracial interaction might be muted if, for example, the share increase creates a “critical mass” of URM students who independently choose to self segregate. Bowen and Bok (1998) present some evidence linking higher black share to the probability of interacting with blacks in college. Table 1 presents additional evidence by tabulating graduates’ responses to a question eliciting their opinion on how much their undergraduate experience contributed to their diversity capital, specifically their “ability to work effectively and get along well with people from different races/cultures.” Responses varied along a five-point scale. Graduates who reported that college improved their diversity capital generally attended schools with a higher share of under-represented minorities. This tendency is most pronounced in the sample of white and Asian students, where there is a clear monotonic relationship between URM share and self-reported diversity capital. White and Asian graduates reporting that college increased their diversity capital “a great deal” attended schools with a 1.2 percentage level such that diversity capital from interactions between Asian-American and whites is not relevant.

point higher URM share, relative to those reporting that college did not influence their diversity capital at all. Together with Bowen and Bok's evidence, this suggests that higher URM shares promote greater interracial interaction.

In spite of the evidence presented by Bowen and Bok and in Table 1, it can still be argued that our models jointly test two hypotheses: that higher URM shares promote interaction and that increased interaction leads to greater productivity and life satisfaction. To more directly isolate the second of these hypotheses, we present the results of additional specifications that make use of graduate's own self-reports regarding how much their college experience contributed to their diversity capital. In these regressions, we include respondents' subjective estimates of their undergraduate experience's contribution to thirteen additional components of human capital that might be important in the labor market. These include the ability to think critically, leadership abilities, oral and written communication skills, and the ability to work independently, among other things. We will test whether individuals who report that their college experience contributed "a great deal" to their diversity capital earn more, or are more satisfied with their jobs or lives, than those whose college experiences contributed nothing to their diversity capital. While this strategy can be criticized on the grounds that the human capital investment measures are subjective and likely to be correlated with unobserved individual characteristics, we consider it to be an informative complement to our other estimation strategies.

A frequent criticism of studies linking college quality to postgraduate outcomes is that students of high unobserved ability tend to sort into schools with high observed quality, as measured by peer test scores or any other measure. The result of this sorting is an upward bias in estimates of the relationship between college quality and (positive) outcomes. To the extent that diversity increases college quality, a similar criticism can be levied against the strategy we outline above. Recent literature has sought to eliminate this bias, either by modelling the college choice process (Brewer et al. 1999, Arcidiacono forthcoming, Arcidiacono 2002), comparing the outcomes of twins who attended different

colleges (Behrman, Rosenzweig and Taubman, 1996), comparing outcomes of individuals accepted to a similar set of colleges but making different choices within that set (Dale and Krueger 2002), using instrumental variable techniques (Behrman et al. 1996), or through selection on observables (Black, Daniel, and Smith 1997).

Our strategy for circumventing this criticism rests on the assumption that the dimension of college quality we are interested in, namely racial diversity, can vary significantly within a university. Once students matriculate at an undergraduate institution, their curricular choices can have a significant impact on the racial composition of their classrooms. Table 2 illustrates this within-school variation by listing the URM share for different majors at three universities in the College and Beyond sample. Each of the three listed universities has an overall URM share between 10 and 13 percent. Although the universities look quite similar in terms of the diversity experienced by undergraduates, further examination reveals that students' classroom diversity experience varies considerably across majors. White and asian political science majors at Colleges B and C, for example, have a very high share of URM classmates, while political science majors at College A experience a URM share very close to the university average. Psychology or sociology majors at College B exhibit a URM share more than twice the university average, while those at Colleges A and C fall very close to their respective averages. Finally, students majoring in physics, chemistry or geology at Colleges B and C have very few, if any, URM classmates, while such majors at College A have a relatively large share of blacks, Hispanics, and Native Americans in their courses.

In addition to studying the effect of overall URM shares on post-graduation outcomes, then, we will focus on the effect of high URM shares within a student's major.⁷

⁷Since the menu of majors varies across institutions, and certain majors may display a high degree of correlation in substance that promotes cross-registration, we collapse majors into eleven categories: (1) natural sciences (physics, chemistry, and geology), (2) biology and related fields such as plant or animal science, (3) engineering, computer science and math, (4) psychology, sociology, and related social sciences, (5) humanities, including history, philosophy, classics, and area studies, (6) economics, (7) political science, (8) language and literature, (9) arts, architecture, and communication, (10) business, (11)

In this analysis, we will control for both major and college fixed effects. This implies that we are comparing the outcomes of students in the same major at different universities, and testing whether students experiencing URM shares high relative to their university average do better than those experiencing URM shares low relative to their university average. The representative regression equation takes the form:

$$Y_{ijk} = \beta_1 X_i + \beta_2 SAT_{jk} + \beta_3 URM_{jk} + \alpha_j + \gamma_k + \epsilon_{ijk}, \quad (3)$$

where j continues to index universities and k indexes majors. Referring to Table 2, we will look to see whether physics, chemistry and geology majors from College A do better than those from Colleges B and C, controlling for any overall difference in outcomes between graduates of those universities. We would also expect political science majors from College A to do worse than their counterparts from Colleges B and C, controlling for overall differences between the universities.⁸

By examining within-university and within-major variation in URM share, we are assuming that once school and major fixed effects are included the error term in equation (4) is uncorrelated with the share of under-represented minorities. We are also assuming that interaction with students within one’s own major is a critical contributor to diversity capital. This may not be the case if, for example, interaction in general survey courses, freshman seminars, or outside the classroom is the most important contributor to diversity capital. The choice to keep certain categories separate, such as economics and business, was driven by a desire to prevent any individual category from representing a disproportionate share of the overall sample. Our results are not sensitive to the categorization of majors, or to the complete disaggregation of majors.

⁸This estimation strategy can be considered suspect if the marginal students in all universities tend to gravitate towards certain “easy” subjects, and if these subjects vary across institutions. Presuming that under-represented minority students are disproportionately represented in the pool of marginal students, and that student quality is not adequately captured by the controls we employ in our regressions, such a pattern would bias us towards finding a negative effect of minority share on later outcomes. Our prior belief is this bias would be less severe than the bias arising from selection across institutions in our sample, suggesting that estimates of URM share effects should be more positive (or less negative) in the major-level analysis. As the results below indicate, this is generally not what we observe.

to diversity capital. Table 1 provides some evidence that interracial exposure within one's major contributes significantly to diversity capital. In addition to summarizing the university-wide URM share for individuals in each response category, this table also shows the mean within-major URM share. White and Asian students reporting that their undergraduate experience contributed significantly to their diversity capital had substantially higher URM shares within their own major. The within-major URM share gradient is steeper than the university-wide URM share gradient. Diversity within one's own major contributes a great deal to perceived diversity capital.⁹

4 Results

4.1 The effect of collegiate diversity on earnings

Tables 3 and 4 present the results of regression specifications that examine the link between collegiate diversity, the ability to interact with individuals of different races, and labor market earnings. Both tables restrict attention to male survey respondents, since labor force participation rates among females are significantly lower than for males. Selecting the sample on the basis of full-time labor force participation rather than gender yields similar results.¹⁰ The dependent variable in each specification is the logarithm

⁹We ran ordered probit regressions to examine whether within-major URM share makes a contribution over and above that of university-wide URM share. These regressions show a significant effect of within-major URM share on perceived contributions to diversity capital.

¹⁰If we use no sample selection criteria whatsoever, estimating the model using the entire 1976 cohort, we do obtain a significant (at the 5% level) positive effect of college-level URM share on earnings when we control for gender and whether a worker was in the no-profit sector government sector, or self-employed. Further analysis shows that this effect operates entirely through the female labor force participation decisions. We choose not to emphasize this result for several reasons. First, the result disappears when using only full-time workers. The practice of limiting the sample when estimating earnings equations is essentially universal in the labor economics literature. Dale and Krueger, for example, limit their estimation to full-time employees. Second, we have a no a priori reason to expect that diversity capital effects would demonstrate themselves entirely through female labor force participation effects. Third,

of earned income in 1995. This variable is reported in ten categorical intervals in the C&B dataset; we use the midpoint of each interval as the estimate of income except for topcoded individuals, for whom we assign a value equal to 112.5% of the topcode.¹¹ Respondents with zero earnings are not separately identified from those with positive earnings in the lowest category; our results are not sensitive to changes in the interpolated income value assigned to individuals in the lowest category.

Table 3 begins by testing the Powell hypothesis in its more direct form: that collegiate diversity improves the quality of higher education, where quality can be inferred by measures of productivity in the labor market. The first specification measures collegiate diversity at the institution level, and controls for cohort average SAT scores, and the respondent's own SAT scores as reported by the institution. The effect of URM share is positive, but quite small relative to its standard error. The effect of attending a selective college is positive but not significant, as is the effect of own-SAT scores.¹²

Some variation in earnings may reflect compensating differentials that in turn reflect variation in workplace amenities. We have multiple strategies to circumvent this issue, including the examination of job satisfaction measures rather than earnings. In Table 3, we address this concern by adding some simple controls for workplace characteristics: whether an individual works in the non-profit sector, for the government, or is self-employed. As the table's second column indicates, each of these factors is associated with significantly lower earnings, suggesting that these types of jobs offer amenities desirable to individuals on the margin between choosing these jobs and positions in this effect appears only in our college-level analysis; introduction of institution and major fixed effects eliminates the result. The relative fragility of the result, along with the high likelihood that it represents selection on hours of work, lead us to discount it.

¹¹Some sample members, who received a pilot survey instrument, have income reported in nine categorical intervals. We use a similar imputation strategy for these respondents.

¹²Our estimated selective college effect is similar to that reported by Dale and Krueger (2002) in their OLS specifications. Our failure to exactly match their results derives from differences in specification; we do not control for their predicted parental income variable and they do not control for the URM share at each institution.

the for-profit sector. Inclusion of these factors increases the estimated impact of an individual's own SAT scores. The estimated effect of institution URM share increases, consistent with a scenario where exposure to minority students increases the likelihood that graduates opt for lower-paying jobs outside the for-profit sector. The estimated URM share effect continues to be statistically insignificant, however. At face value, the point estimate suggests that a one-percentage-point increase in URM share increases earnings by roughly 0.6%.

If the Powell hypothesis operates through classroom interaction, then the rate of exposure to under-represented minorities within one's major field should predict greater productivity after graduation. The final regressions in Table 3 examine variation in peer group demographic composition at the major level. As discussed in the preceding section, this strategy allows us to control for major and institution fixed effects, removing any component in variation in individual earnings related to institution-wide factors or individual major choices. This strategy will also permit us to estimate any effects with greater precision, since the unit of independent observation is now the major-within-institution, rather than the institution. With and without controls for sector of employment, the results of these tests are similar. While there is some suggestive evidence that exposure to peers with higher test scores increases earnings, there is no significant effect of within-major URM share on earnings. In both specifications, point estimates are negative and less than one-half the size of the associated standard errors.

The results in Table 3 suggest that college-age investments in diversity capital are not an important determinant of earnings. Table 4 tests this conclusion more directly, utilizing a variable which we interpret as a respondent's subjective estimation of the contribution that college made to their own diversity capital. The table shows results from a single regression, which controls for fourteen separate hypothesized components of human capital.¹³ Each of these subjective estimates of contribution to human capital

¹³The regression also controls for own-SAT score, average SAT score within institution and major, plus institution and major fixed effects.

are measured along a five-point scale. In this regression, we treat these as cardinal data and control for them as though they were linear variables; alternative specifications yield similar results. The coefficients indicate the average boost to earnings associated with a one-point increase in a respondent's estimate of the contribution that college made to a particular human capital component. The fourteen components are arranged in the table from the most positive to most negative effect on earnings.

Of the fourteen components, six show a significant positive association with earnings. The first four components conform to a vision of the skills rewarded in the marketplace: competitiveness, leadership, and the ability to work cooperatively or independently. Development of an ability to make friends, which would presumably be a critical skill in careers involving the building of client relationships, also appears as a positive determinant of earnings. Those individuals who developed an "ability to have a good rapport with people holding different beliefs" also receive rewards in the labor market. This last finding suggests an alternative formulation of the Powell hypothesis: that exposure to *diversity of opinion* improves the quality of higher education.¹⁴

The ability to "work effectively and get along with" members of other racial or cultural groups shows up as one of six factors contributing significantly negatively to earnings. The results suggest that the marketplace has similarly harsh rewards for written and oral communication skills, religious values and the ability to adapt to change. Advocates of liberal arts education will take heart from the fact that knowledge of a particular field or discipline is the least remunerative of any human capital component included in the survey. The possibility exists that individuals who acquire these skills simply gravitate towards jobs that are less rewarding financially but otherwise more satisfying; we test this hypothesis below.

¹⁴It is possible that racial diversity is a mechanism for obtaining diversity of opinion. Removing the "ability to have a good rapport with people holding different beliefs" variable still leaves the subjective measure of the value added from interacting with other races and cultures with a negative, though insignificant, effect on earnings.

The subjective nature of these human capital investment indicators implies that all these results should be taken with a grain of salt. Nonetheless, these findings, along with those in Table 3, argue uniformly against the notion that those individuals who fail to interact with members of other racial groups are placed at a disadvantage in the labor market.

4.2 The effect of collegiate diversity on educational attainment

Educational attainment is a common outcome measure used in the literature on peer and neighborhood effects (see, for example, Cutler and Glaeser 1997; Solon, Page and Duncan 2000). Although the educational attainment of individuals matriculating at selective colleges may excite relatively little interest from a policy perspective, Table 5 presents the results of probit regressions that examine two educational outcomes likely to influence an individual's productivity and career satisfaction. Our first two probits examine the likelihood of graduation. According to the institutional data files included in the College and Beyond database, roughly 15% of matriculants fail to graduate from their enrolling institution. The second pair of probits considers the self-reported outcome of receiving a graduate or professional degree after graduation. The entries in Table 5 have been rescaled to indicate the estimated marginal impact of a unit change in each independent variable when all covariates are set equal to their respective means. As with the preceding tables, the sample in these specifications is restricted to males. Estimation on the full sample yields similar results.¹⁵

A matriculant's probability of graduation increases significantly with his or her combined SAT score. Students enrolling at more selective institutions, or selecting a major where their peers have higher test scores, are significantly more likely to graduate. The estimated effect of URM share on graduation is negative and insignificant in both spec-

¹⁵In a separate analysis, we estimated the relationship between a respondent's assessment of the contribution their undergraduate experience made to their diversity capital and the probability of graduating or receiving a graduate degree. Results of that exercise mirror those reported here.

ifications.

Matriculants with high SAT scores are significantly more likely to go on to receive graduate degrees. At the institution level, neither average SAT scores nor URM share have any significant impact on this probability. At the major level, URM share continues to be insignificant, with a sign opposite of the institution-level estimate, while peer SAT scores show up as a significant positive determinant of graduate school enrollment.

4.3 The effect of diversity on measures of job and life satisfaction

Our use of earnings as an outcome measure is driven by a view that the purpose of a college education, or any other investment in human capital, is to increase an individual's productivity in later periods. In competitive labor markets, higher productivity should translate into higher compensation, other things equal. It is possible, however, that individuals reap some benefit from exposure to racial diversity in college and receive these benefits outside of their labor earnings. The mechanism for this benefit transmission may relate to workplace conditions or to aspects of life completely outside the labor market, such as increased utility from interacting with others in nonmarket settings, or from consuming goods and services most commonly associated with other cultures. To consider these possibilities, we take advantage of two items asked of College and Beyond survey respondents, relating to their overall satisfaction with their job and life. Responses varied along a five point scale. Tables 6, 7, 8 and 9 report the results of ordered probits that analyze these responses. When analyzing job satisfaction, we restrict our attention to males; life satisfaction models are estimated for the entire population.

Table 6, which considers the determinants of job satisfaction, reveals some noteworthy results. In both models, which test the impact of institution- and major-level peer characteristics respectively, respondent SAT scores predict significantly *lower* job satisfaction. This effect could be rationalized as the effect of mean reversion in individual outcomes, when individuals are slow to adjust their expectations. For example, an individual with SAT scores in the 99th percentile may be disappointed to have a career

or income that ranks only in the 90th percentile.

Peer group characteristics, whether SAT scores or URM share, and whether measured at the institution or major level, have no significant impact on career satisfaction. The URM share estimates displays opposite signs in the two specifications and neither are significant.

Table 7 adopts a strategy similar to that employed in Table 4, decomposing the influence of college education on job satisfaction by comparing students who varied in their estimation of how much their experience contributed to various components of human capital. Not surprisingly, many of the factors that positively influence earnings also positively influence job satisfaction. Undergraduate investments in leadership abilities, the ability to work independently and the ability to form and retain friendships are all significant predictors of job satisfaction. The ability to engage people with different beliefs, associated above with an alternative formulation of the Powell hypothesis, is a positive but insignificant predictor of job satisfaction. Competitiveness and the ability to work cooperatively are apparently less important to job satisfaction than they are to earnings. Interestingly, individuals who acquired an active interest in community service in college tend to report higher job satisfaction, even though their earnings are essentially unaffected.

Of the fourteen human capital components examined only one, the ability to work and relate to individuals from different races and cultures, appears as a significant negative predictor of job satisfaction. This finding contradicts any supposition that individuals exposed to minority students as undergraduates take on highly satisfying but poorly paying jobs. The results in this table and Table 4 allow us to statistically reject the hypothesis that collegiate investments in diversity capital, as reported by survey respondents, have even a small positive impact on either earnings or job satisfaction.

The determinants of life satisfaction bear a strong similarity to those for job satisfaction, even though the sample includes females in the former case but not the latter. Table 8 shows that individuals with higher SAT scores report lower satisfaction, while

female respondents report significantly higher satisfaction levels. Whether measured at the institution or major level, peer group characteristics have no significant bearing on life satisfaction. The URM share variable, in particular, once again changes signs across specifications. In this case, neither point estimate exceeds the associated standard error in absolute value.

Table 9 reports the results of an analysis of the relationship between the fourteen types of collegiate human capital investment and life satisfaction reported by males and females twenty years after matriculation. Five factors show a significant positive relationship with life satisfaction. Foremost among these factors is the ability to form and retain friendships. This factor has already been shown to positively influence earnings and job satisfaction; its relative importance outside the realm of one's career appears to be even stronger. Self-assessed investments in leadership ability, the ability to work independently, interest in community service, and the ability to adapt to change all show a positive impact on life satisfaction. These results provide strong evidence for those administrators interested in promoting service and learning activities for undergraduates outside the classroom. Interestingly, competitiveness, the ability to work cooperatively, and the ability to engage people with different beliefs, three factors rewarded significantly by the marketplace, have no discernable impact on life satisfaction.

As in Table 7 above, Table 9 reveals that the ability to “work effectively and get along well with” people from different races and cultures has an estimated negative impact on life satisfaction. Again, this finding allows us to statistically reject the hypothesis of even a small positive effect of diversity capital on life satisfaction.

5 Conclusions

This paper, which examines the post-graduation outcomes of individuals attending college as the Supreme Court heard *Regents of the University of California v. Bakke* in 1978, finds no evidence to support those who “widely believed” that racial diversity

improves the quality of higher education. This lack of evidence holds across a large set of outcome measures including earnings, the probability of graduating, the probability of attending graduate school, job satisfaction, and life satisfaction. The absence of evidence is particularly striking given the positive bias usually expected in studies of the relationship between education quality and later outcomes.

In the context of the model discussed above, these results can be interpreted in several ways. For one, “diversity capital” may not exist. That is to say, two individual’s ability to profitably interact in the marketplace is not impeded by any racial or ethnic differences between them. Alternatively, interactions between individuals of different races may be permanently hampered by differences and insensitive to repeated interactions. Diversity capital may be an important phenomenon, but the college environment may simply not represent a critical period in an individual’s process of accumulation. Yet another possibility is that, if individuals primarily interact with those who have similar abilities, aggressive affirmative programs may deter cross-racial interaction as the college preparation levels are then very different across racial groups. Hence, diversity capital may be obtained when attending colleges where there is some overlap between the levels of college preparation. Finally, diversity capital might be a less important attribute for college graduates than for the general public, since the population of college graduates in the United States is decidedly less racially diverse than the country as a whole. Regardless of the interpretation, however, the benefits of affirmative action through increased racial diversity do not spill over to other racial groups.

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Table 1: The relationship between reported and statistical exposure to minorities.

Undergraduate experience helped develop “ability to work effectively and get along well with people from different races/cultures”...	Average college-wide URM share for respondents:			Average within-major URM share for respondents:		
	overall	Minorities	Whites and Asians	overall	Minorities	Whites and Asians
A Great Deal (5) N=4,360	7.0%	8.3%	6.8%	7.1%	10.8%	6.7%
(4) N=5,977	6.7%	8.5%	6.6%	6.7%	10.6%	6.4%
(3) N=6,126	6.3%	8.2%	6.2%	6.1%	10.5%	5.9%
(2) N=3,758	6.0%	7.9%	5.9%	5.7%	9.5%	5.5%
None At All (1) N=1,932	5.8%	7.8%	5.6%	5.7%	10.2%	5.4%
Uncertain N=232	5.8%	6.1%	5.8%	5.7%	6.8%	5.6%

Note: Sample sizes and statistics are unweighted. Source: College and Beyond survey, 1976 entering cohort.

Table 2: Illustration of variation in exposure across majors and colleges

Institution	Percent under-represented minority in the 1976 entering cohort:			
	Overall	Political Science majors	Psychology/ Sociology majors	Physics/Chemistry/ Geology majors
College A	12.3%	11.1%	14.9%	16.1%
College B	13.4%	22.5%	28.7%	0.0%
College C	9.9%	29.0%	14.3%	4.0%

Table 3: Collegiate exposure to minorities and earned income

Independent variable	Dependent variable: ln(earned income, 1995)			
URM share at undergraduate institution	0.339 (1.028)	0.617 (0.970)	—	—
URM share within major at undergraduate institution	—	—	-0.165 (0.366)	-0.155 (0.359)
Entering cohort average SAT scores (/100)	0.029 (0.021)	0.025 (0.020)	—	—
Average SAT scores within major for entering cohort (/100)	—	—	0.064 (0.036)	0.065 (0.036)
Own SAT score (/100)	0.007 (0.012)	0.018 (0.011)	-0.006 (0.008)	0.005 (0.007)
Nonprofit sector	—	-0.462 (0.041)	—	-0.456 (0.037)
Government employee	—	-0.521 (0.032)	—	-0.500 (0.026)
Self-employed	—	-0.088 (0.046)	—	-0.090 (0.036)
Institution fixed effects	No	No	Yes	Yes
Major fixed effects	No	No	Yes	Yes
N	9,973	9,973	9,223	9,223
R ²	0.004	0.055	0.066	0.114

Note: Standard errors, corrected for potential correlation within undergraduate institutions or within majors in undergraduate institutions, appear in parentheses. Data source is the College and Beyond survey of the 1976 entering cohort. Sample is restricted to white and asian males. Observations are weighted using C&B survey weights.

Table 4: Decomposing the influence of college education on 1995 earnings

Independent variable: response to “How much did your undergraduate experience help you develop in these ... areas:”	Coefficient	Std. Error
Competitiveness	0.089	0.011
Leadership abilities	0.067	0.010
Ability to work cooperatively	0.039	0.012
Ability to work independently	0.036	0.012
Ability to have a good rapport with people holding different beliefs	0.036	0.012
Ability to form and retain friendships	0.030	0.012
Analytical and problem-solving skills/ability to think critically	0.020	0.013
Active interest in community service	-0.010	0.009
Ability to communicate well orally	-0.024	0.011
Ability to adapt to change	-0.027	0.011
Ability to work effectively and get along well with people from different races/cultures	-0.027	0.012
Religious values	-0.031	0.009
Ability to write clearly and effectively	-0.036	0.010
Knowledge of a particular field/discipline	-0.056	0.010

Note: Dependent variable is $\ln(\text{earned income, 1995})$. Sample consists of white and asian males in the 1976 entering cohort of the College and Beyond Survey, omitting those who refrained from answering or responding “uncertain” to any of the above items ($N=8,483$). Each item is coded on a five point ordinal scale; higher values indicate a greater contribution to development. Regression also controls for race, own SAT score, average SAT score of cohort within college and major, institution fixed effects, and major fixed effects. Observations are weighted by C&B survey weights. Coefficients in bold type are significant at the 5% level.

Table 5: Collegiate exposure to minorities and educational outcomes

Independent variable	Graduated from matriculating institution		Received any graduate degree	
URM share at undergraduate institution	-0.303 (0.376)	—	0.331 (0.614)	—
URM share within major at undergraduate institution	—	-0.313 (0.205)	—	-0.306 (0.239)
Entering cohort average SAT scores (/100)	0.038 (0.015)	—	0.014 (0.011)	—
Entering major cohort average SAT scores (/100)	—	0.032 (0.013)	—	0.046 (0.017)
Own SAT score (/100)	0.014 (0.005)	0.008 (0.002)	0.071 (0.008)	0.063 (0.005)
Major fixed effects	No	Yes	No	Yes
Institution fixed effects	No	Yes	No	Yes
N	10,307	9,408	10,279	9,516
log likelihood	-4,115	-2,279	-6,683	-5,860

Note: Table entries are probit coefficients transformed to indicate marginal effects of variables when other covariates are set equal to their respective means. Standard errors, corrected for potential correlation within majors at undergraduate institutions, appear in parentheses. Data source is the College and Beyond survey of the 1976 entering cohort. Observations are weighted using C&B survey weights.

Table 6: Exposure to minorities and job satisfaction

Independent variable	Ordered probit coefficients	
URM share at undergraduate institution	-0.523 (0.487)	—
URM share within major at undergraduate institution	—	0.678 (0.449)
Own SAT score (/100)	-0.035 (0.009)	-0.033 (0.011)
Entering cohort average SAT scores (/100)	0.003 (0.013)	—
Entering major cohort average SAT scores (/100)	—	0.034 (0.033)
Major fixed effects	No	Yes
Institution fixed effects	No	Yes
N	9,986	9,247
Log likelihood	-11,034	-10,141

Note: Table entries are ordered probit coefficients; the dependent variable is measured on a five-point ordinal scale, where higher values indicate greater satisfaction. Standard errors, corrected for potential correlation within undergraduate institutions (columns 1 and 3) or within majors at undergraduate institutions (columns 2 and 4), appear in parentheses. Data source is the College and Beyond survey of the 1976 entering cohort. Observations are weighted using C&B survey weights.

Table 7: Decomposing the influence of college education on job satisfaction in 1995

Independent variable: response to “How much did your undergraduate experience help you develop in these ... areas:”	Coefficient	Std. Error
Leadership abilities	0.073	0.014
Ability to work independently	0.043	0.015
Active interest in community service	0.033	0.014
Ability to have a good rapport with people holding different beliefs	0.033	0.020
Ability to form and retain friendships	0.029	0.013
Competitiveness	0.023	0.015
Analytical and problem-solving skills/ability to think critically	0.023	0.020
Religious values	0.019	0.014
Ability to work cooperatively	0.015	0.017
Knowledge of a particular field/discipline	0.011	0.013
Ability to adapt to change	0.011	0.015
Ability to communicate well orally	0.005	0.015
Ability to write clearly and effectively	9.41×10^{-4}	0.017
Ability to work effectively and get along well with people from different races/cultures	-0.037	0.018

Note: Dependent variable is a five-point measure of job satisfaction in 1995, scaled so that higher values imply greater satisfaction. Table entries are ordered probit coefficients. Sample consists of white and asian males in the 1976 entering cohort of the College and Beyond Survey, omitting those who refrained from answering or responding “uncertain” to any of the above items ($N=8,975$). Each item is coded on a five point ordinal scale; higher values indicate a greater contribution to development. Regression also controls for race, own SAT score, average SAT score of cohort within college and major, institution fixed effects, and major fixed effects. Coefficients in bold type are significant at the 5% level.

Table 8: Exposure to minorities and life satisfaction

Independent variable	Ordered probit coefficients	
URM share at undergraduate institution	-0.273 (0.732)	—
URM share within major at undergraduate institution	—	0.044 (0.252)
Own SAT score (/100)	-0.017 (0.008)	-0.024 (0.007)
Entering cohort average SAT scores (/100)	-0.004 (0.013)	—
Entering major cohort average SAT scores (/100)	—	0.026 (0.019)
Female	0.105 (0.018)	0.135 (0.020)
Major fixed effects	No	Yes
Institution fixed effects	No	Yes
N	19,686	18,090
Log likelihood	-20,750	-18,925

Note: The dependent variable is measured on a five-point ordinal scale, where higher numbers indicate greater satisfaction. Standard errors, corrected for potential correlation within undergraduate institutions (columns 1 and 3) or within majors at undergraduate institutions (columns 2 and 4), appear in parentheses. Data source is the College and Beyond survey of the 1976 entering cohort. Observations are weighted using C&B survey weights.

Table 9: Decomposing the influence of college education on life satisfaction

Independent variable: response to “How much did your undergraduate experience help you develop in these ... areas:”	Coefficient	Std. Error
Ability to form and retain friendships	0.086	0.011
Leadership abilities	0.073	0.010
Ability to work independently	0.055	0.012
Active interest in community service	0.034	0.012
Ability to adapt to change	0.026	0.011
Religious values	0.018	0.009
Ability to communicate well orally	0.012	0.010
Ability to write clearly and effectively	0.011	0.013
Analytical and problem-solving skills/ability to think critically	0.011	0.015
Knowledge of a particular field/discipline	0.009	0.009
Ability to have a good rapport with people holding different beliefs	0.006	0.014
Competitiveness	-4.44*10 ⁻⁴	0.011
Ability to work cooperatively	-0.011	0.011
Ability to work effectively and get along well with people from different races/cultures	-0.034	0.011

Note: Dependent variable is a five-point measure of overall life satisfaction, scaled so that higher values imply greater satisfaction. Table entries are ordered probit coefficients. Sample consists of white and asian members of the 1976 entering cohort of the College and Beyond Survey, omitting those who refrained from answering or responding “uncertain” to any of the above items ($N=16,365$). Each item is coded on a five point ordinal scale; higher values indicate a greater contribution to development. Regression also controls for gender, race, own SAT score, average SAT score of cohort within college and major, institution fixed effects, and major fixed effects. Coefficients in bold type are significant at the 5% level.

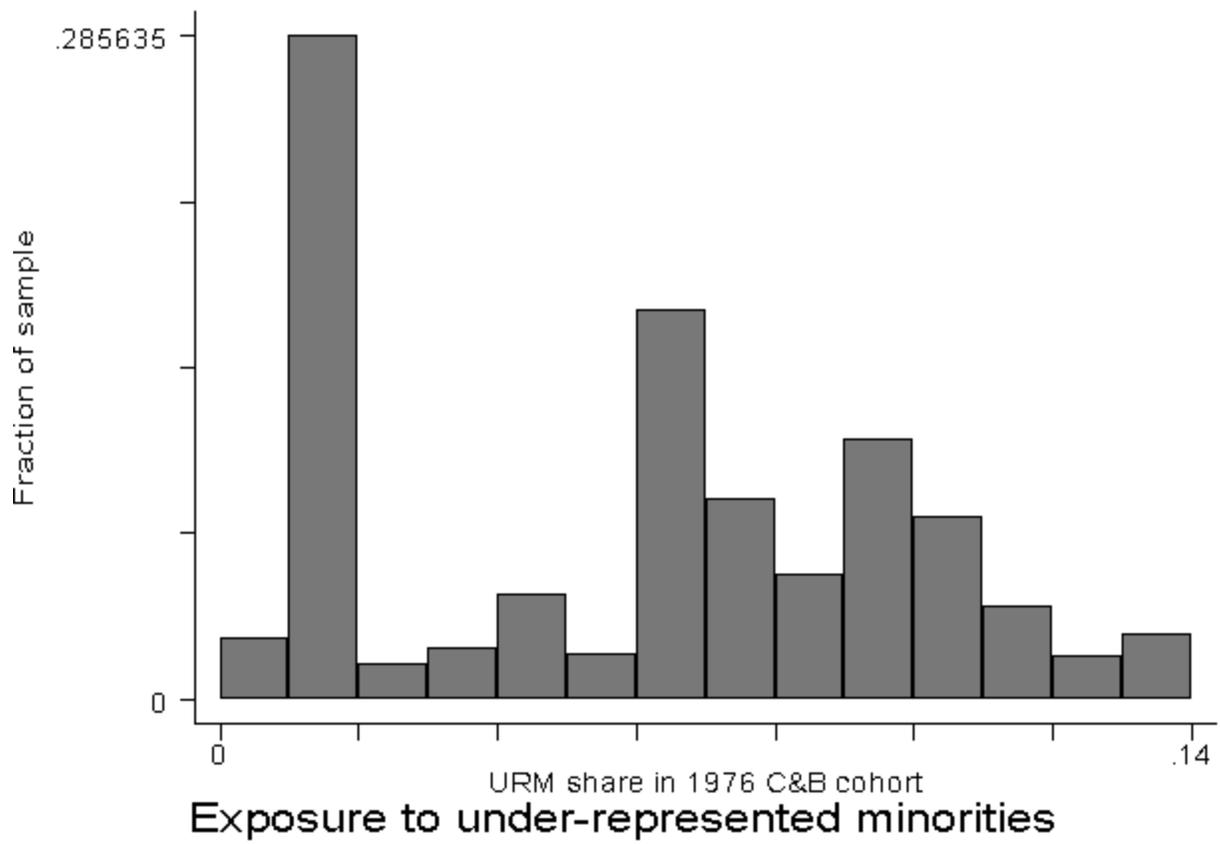
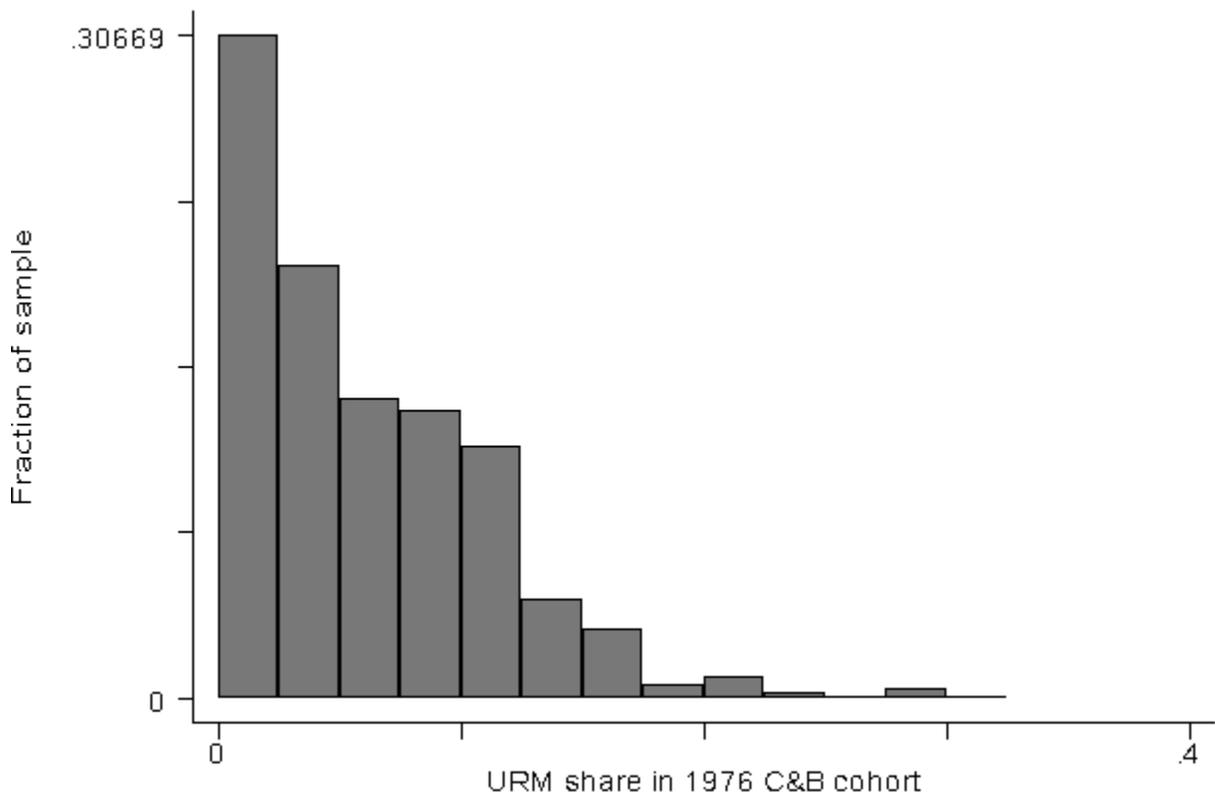


Figure 1



Within-major exposure to under-represented minorities

Figure 2. Note: this graph omits one outlying individual with within-major URM share = 1.

Table A1: List of institutions represented in the College and Beyond database

Barnard College
Bryn Mawr College
Columbia University
Denison University
Duke University
Emory University
Georgetown University
Hamilton College
Kenyon College
Miami University (Ohio)
Northwestern University
Oberlin College
Pennsylvania State University, State College
Princeton University
Rice University
Smith College
Stanford University
Swarthmore College
Tufts University
Tulane University
University of Michigan, Ann Arbor
University of North Carolina, Chapel Hill
University of Notre Dame
University of Pennsylvania
Vanderbilt University
Washington University, Saint Louis
Wellesley College
Wesleyan University
Williams College
Yale University

Table A2: Major classifications

1	Chemistry, Physics, Geology, Other Physical Sciences
2	Engineering, Computer and Information Sciences, Mathematics
3	Agriculture, Biological Sciences, Pre-Med, Nursing, Dentistry, Health Sciences
4	Psychology, Sociology, Other Social Sciences
5	East Asian Studies, Area Studies, Soviet & East European Studies, Near or Middle Eastern Studies, Judaic Studies, African American Studies, Latin American Studies, Hispanic Studies, British Studies, Other Studies, Asian and French Area Studies, History, Classics, Philosophy, Religion, General Humanities, General Arts & Sciences
6	Economics
7	Political Science
8	Comparative Literature, Linguistics, English Literature, General Letters, French, Latin, Greek, German, Italian, Russian, Romance Languages, Slavic Languages, Chinese, Japanese, Hebrew, Arabic, Foreign Languages and Literature
9	Art History, Music, Theater, Art, Communications, Architecture, Environmental Design
10	Business, Management
11	Education, Other Fields

Appendix Table 3: Summary Statistics

Variable	Males			Females		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
ln(earned income, 95)	11,135	11.151	0.851	10,588	9.856	1.787
Own SAT score	10,879	1197	160	10,240	1151	160
Entering cohort average SAT score	11,488	1091	146	10,929	1079	150
Average SAT score within major for entering cohort	11,488	1104	157	10,929	1074	169
Under-represented minority	11,488	0.044	0.206	10,929	0.061	0.240
URM share at undergraduate institution	11,488	0.063	0.038	10,929	0.059	0.035
URM share within major at undergraduate institution	11,488	0.059	0.051	10,929	0.062	0.052
Received any graduate degree	11,451	0.566	0.496	10,891	0.491	0.500
Graduated from matriculating institution	11,488	0.843	0.363	10,929	0.835	0.371
Nonprofit sector, current or most recent job	11,488	0.098	0.298	10,929	0.189	0.391
Self-employed, current or most recent job	11,488	0.140	0.347	10,929	0.136	0.342
Government employee, current or most recent job	11,488	0.105	0.307	10,929	0.147	0.354
Job satisfaction in 1995 (5 point scale: 1 = most satisfied)	11,127	1.751	1.000	10,661	1.825	1.042
Life Satisfaction (5 point scale: 1 = most satisfied)	11,454	1.788	0.873	10,877	1.725	0.860
Analytical and problem-solving skill/ability to think critically (5 point scale: 5 = college helped a great deal)	11,317	4.048	0.975	10,701	3.992	1.021
Knowledge of particular field/discipline (5 point scale: 5 = college helped a great deal)	11,345	3.537	1.166	10,756	3.653	1.165
Leadership abilities (5 point scale: 5 = college helped a great deal)	11,278	2.920	1.152	10,660	2.986	1.226
Active interest in community service (5 point scale: 5 = college helped a great deal)	11,217	2.302	1.144	10,633	2.456	1.209
Ability to work independently (5 point scale: 5 = college helped a great deal)	11,331	3.894	0.977	10,740	4.041	0.985
Ability to form and retain friendships (5 point scale: 5 = college helped a great deal)	11,329	3.533	1.139	10,746	3.598	1.205
Ability to have a good rapport with people holding different beliefs (5 point scale: 5 = college helped a great deal)	11,326	3.501	1.135	10,743	3.552	1.179

Appendix Table 3: Summary Statistics

Variable	Males			Females		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Ability to work/get along with people from different races/cultures (5 point scale: 5 = college helped a great deal)	11,327	3.286	1.187	10,737	3.345	1.234
Religious values (5 point scale: 5 = college helped a great deal)	11,218	2.151	1.244	10,579	2.143	1.242
Ability to communicate well orally (5 point scale: 5 = college helped a great deal)	11,364	3.345	1.088	10,783	3.398	1.152
Competitiveness (5 point scale: 5 = college helped a great deal)	11,270	3.503	1.123	10,607	3.304	1.196
Ability to work cooperatively (5 point scale: 5 = college helped a great deal)	11,328	3.233	1.038	10,739	3.318	1.112
Ability to write clearly and effectively (5 point scale: 5 = college helped a great deal)	11,392	3.760	1.049	10,838	3.909	1.062
Ability to adapt to change (5 point scale: 5 = college helped a great deal)	11,205	3.362	1.073	10,579	3.411	1.143