

Does the River Spill Over?

Estimating the Economic Returns to Attending a Racially Diverse College

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Abstract

This paper evaluates the frequently argued but heretofore little-tested hypothesis that increasing minority representation in elite colleges generates tangible benefits for majority-race students. Using data on graduates of 30 selective universities, we find only weak evidence of any relationship between collegiate racial composition and the post-graduation outcomes of white or Asian students. Moreover, the strongest evidence we uncover suggests that increasing minority representation by lowering admissions standards is unlikely to produce benefits, and may in fact cause harm by reducing the representation of minority students on less-selective campuses. While affirmative action may still be desirable for the benefits it conveys on minority students, these results provide little support for “spillover” effects on majority-race students.

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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

For more than a quarter century, the belief that diversity contributes to the quality of undergraduate and graduate education has motivated court opinions and college policies regarding racial preferences in admissions.¹ Surprisingly, the social sciences have provided very little evidence to support or refute this claim. Such evidence would clearly be of great interest both to policy makers and to scholars conducting more general studies of the impacts of affirmative action in higher education.²

In the absence of programs employing random assignment of individuals to campuses with varying degrees of racial diversity, any evidence offered on this question will be subject to criticism that diversity may correlate with unobserved determinants of individual outcomes.³ In such a scenario, policy makers face an unenviable choice of making uninformed decisions or paying attention to potentially imperfect research findings.

This paper does not claim to solve all the issues involved in the identification of racial diversity effects. As described below, however, we use a promising data source, the College & Beyond dataset,

¹The most prominent recent example is the Supreme Court’s 2003 rulings in the cases *Gratz v. Bollinger* and *Grutter v. Bollinger*. In these cases, the court upheld the use of racial preferences in admissions, so long as applicants receive “truly individualized consideration.” Excluded from the set of legal practices was a policy at the University of Michigan which granted under-represented minorities a fixed number of points in an admission rating system. See Golden, D. “Colleges Cut Back Minority Programs After Court Rulings,” *Wall Street Journal*, December 30, 2003, p.A1

²For example, Arcidiacono (2005) 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.

³There have been analyses exploiting random assignment of students to roommates of varying race or ethnicity, see for example Duncan et al. 2006. The impact of cross-racial roommate assignments, however, may be sensitive to the degree of affirmative action practiced on an individual campus, and hence may provide very little insight as to the prospective impact of altering overall racial composition.

and a variety of identification strategies to gain some degree of insight into the question of whether exposure to diversity is beneficial for college students. We find no evidence of a positive link between the two variables, and the imperfections of our research design most likely lead us to overstate the likelihood that there is such a link.

We begin by translating Powell’s hypothesis into economic terms. Building on the existing concepts of human capital (Becker 1964) and ethnic capital (Borjas 1992; Borjas 1995), and inspired by Lazear’s (1995) model of cultural assimilation, we introduce the concept of “diversity capital.” We define diversity capital as a measure of an individual’s ability to create surplus in interactions with individuals of different racial, ethnic, or socioeconomic backgrounds. In this context, the beliefs articulated by Lewis Powell in 1978 translate into a hypothesis that a diverse student body contributes, directly or indirectly, to diversity capital. With this proposed causal mechanism in mind, we focus our empirical analysis on a direct estimation of the relationship between minority representation and the post-graduation outcomes of undergraduates on elite campuses.

Although our model of the returns to collegiate diversity is simple, empirical estimation of the returns to diversity is complicated by an omitted variables problem: college racial composition may correlate with unobserved institution-level components of education quality, or with individual-level determinants of productivity. In our sample of selective colleges, the sign of this bias is most likely positive. Among selective colleges, those matriculating the students with the highest SAT scores also tend to have higher minority representation. If student SAT scores are imperfectly but positively correlated with unobserved determinants of productivity, our estimates will exhibit a positive bias and thus overstate the case that exposure to under-represented minorities improves postgraduate outcomes.⁴

In one set of specifications, we allow the effect of exposure to diversity to vary with the relative position of individual students and peers in the SAT score distribution. In general, we find that the type of diversity increase brought about by affirmative action policies – which brings lower-scoring minority students into potential contact with higher-scoring majority-race students – is

⁴In regression models reported in the appendix, we employ models that exploit *within-institution* variation in racial composition, based on students’ declared majors, incorporating both college- and major-specific 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. This strategy will be problematic in the event that minority students sort into “easy” majors at each college, and the identity of the easy major varies across campuses. These specifications generally support the same conclusions as our basic analysis.

if anything detrimental to majority-race students.⁵ Affirmative action may therefore introduce a socially costly form of “mismatch:” minority students are transferred from campuses where their academic background is comparable to their peers of other races to campuses where their credentials are on average significantly worse than those of their peers. While minority students themselves may derive some benefit from such a transfer, majority-race students do not benefit and may in fact endure a cost.

In a final set of specifications, we use students’ own estimates of the quality of their collegiate exposure to racial diversity in place of basic representation measures. We find that students who report that their college contributed more to their ability to work with members of other racial groups tend to fare worse in the labor market.

Accepting these associations as causal, the evidence thus suggests that a policy of maximizing the benefits of diversity accruing to majority-race students would involve reducing or eliminating cross-race differences in admission standards. This implies that there is actually a trade-off between conferring benefits on under-represented minorities and producing gains from exposure to diversity. Society may wish to preserve affirmative action as a redistributive policy, but the efficiency claims made by Powell and others appear to be significantly overstated.

2 Existing Literature

The “widely believed” view that racial diversity improves the quality of education is based on astonishingly little empirical evidence. 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. 2003, Hoxby 2000), none of these studies provide any evidence consistent with the hypothesis that racial diversity improves education. Indeed, most existing studies report 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 2005; Vigdor 2004; see Aldrich, Arcidiacono, and Vigdor 2005 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). Duncan et al.

⁵Arcidiacono, Kahn and Vigdor (2008) present evidence corroborating this pattern, by showing that across-race interaction is most likely to occur when students of different races are relatively well matched on SAT scores.

(2006) exploit conditional random roommate assignment at one large public university to show that cross-racial exposure influences individual attitudes and friendship patterns; however the data set used does not contain information on postgraduate outcomes.

The most noteworthy existing study of collegiate diversity and postgraduate outcomes, Black, Daniel and Smith (2001), reports a positive relationship between college percent black and earnings in the National Longitudinal Survey of Youth.⁶ This finding holds under a number of specifications where the endogeneity of college choice is dealt with using selection on observables. While supportive of Lewis Powell’s hypothesis at face value, two caveats should be attached to the Black, Daniel and Smith study. First, their analysis relies only on college-level variation in percentage black. If higher quality colleges have more aggressive affirmative action programs, a higher percentage black may be picking up the causal effect of an unobserved quality measure. This is the primary empirical concern affecting our analysis below. Second, the study uses a broad sample of undergraduate institutions, including many less competitive institutions where affirmative action is not an issue (Kane 1998). Even accepting this positive result as unbiased, then, it may reflect a heterogeneous underlying mechanism, whereby the impact of diversity is positive in less-selective institutions and unimportant in elite colleges. In such a scenario, affirmative action programs in elite colleges could actually be counterproductive, as they would reduce minority representation on those campuses where it has the most beneficial impact. We present evidence below that is broadly consistent with this scenario. To judge the worthiness of affirmative action policies at elite undergraduate institutions, it is most appropriate to study the impact of minority representation in those institutions themselves.⁷

Our study shares one caveat with the Black, Daniel, and Smith study while addressing another. We focus on a sample of highly selective institutions where affirmative action policies have a clear impact on overall racial composition. Like Black, Daniel, and Smith, however, we rely primarily on across-institution variation, which introduces potential concerns regarding omitted variable bias. Given the positive association between minority representation and observed indicators of college quality in our data, we think it is reasonable to conclude that this bias is positive. Thus our estimates will if anything overstate the positive impact of diversity on postgraduate outcomes.⁸ In the absence

⁶A more detailed explanation of their methodology is given in Black, Daniel and Smith (1997).

⁷Further study of the impact of minority representation at less-selective institutions, particularly study that can take advantage of within-institution variation in representation, would appear to be a promising venue for further research. Unfortunately, we are not aware of any dataset that would allow such a study.

⁸As noted above, we use within-institution variation in racial composition in some alternative specifications reported in the appendix. These specifications, which include college fixed-effects, are generally consistent with the main results.

of direct experimental manipulation of exposure to diversity, on a scale larger than that utilized by Duncan et al. (2006), our goal is to present the most reliable evidence that can be feasibly gleaned from appropriate data.

3 Interpreting Powell: Diversity Capital

In the standard economic model of investment in education, each individual chooses to acquire additional education if the present value of expected future returns from their up-front investment exceed those available in other asset markets. These educational investments produce human capital (Becker, 1964) that then have a return in the labor market. Lewis Powell’s argument that diversity promotes an “atmosphere of ‘speculation experiment and creation... essential to the quality of higher education” can thus be 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 assumptions beyond Powell’s assertion. First, we assume that the component of human capital influenced by racial diversity is a distinct quantity, which we refer to as diversity capital. Second, inspired by Lazear’s (1995) model of cultural assimilation and Borjas’ (1992; 1995) idea that productivity and other traits are transmitted within well-defined groups in close mutual contact, we assume that the returns to diversity capital accrue when individuals are forced to interact with persons of different racial backgrounds in the marketplace.

Consider a two period model where in the first period an individual invests in skills and in the second period receives payoffs for the skills acquired. Let there be two ethnic groups. In the second period, all individuals share a common location with a fixed group composition. In the investment period, locations vary in their ethnic composition and individuals can choose their preferred level of across-group interaction. We ignore other human capital investments which serve only to complicate the model while not changing the substantive results. Interaction with members of the other ethnic group produces ‘diversity capital’, D , that has a return in the labor market. Consider an individual in the i th ethnic group. Let γ_j^i be the fraction of individuals at first-period location j that are from the other group. The cost of acquiring k units of diversity capital is given by $c(k, \gamma_j^i)$, a function that is increasing in its first argument, decreasing in its second, and convex.⁹ In our empirical work,

⁹The 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 the proportion of under-represented

we will introduce the possibility that the cost of acquiring diversity capital depends not only on the representation of the other group, but on the characteristics of those other group members. We discuss the implications of this type of extension below.

The payoff for investing in diversity capital comes in the second period. In the second period individuals enter the marketplace. These interactions generate some level of surplus which is divided evenly between the two partners, labeled 1 and 2 respectively. When two members of the same ethnic group interact, per-person surplus is a constant which we normalize to one. When members of different group interact, the surplus depends upon the amount of diversity capital each individual possesses. This mapping is given by $f(D^1, D^2)$ where we assume that the ordering of the partners is not relevant: $f(D^1, D^2) = f(D^2, D^1)$. The function is increasing in both of its arguments, bounded below by zero, and bounded above by one.

In the second period individuals interact with N partners. The probability of an interaction occurring with a member of the other ethnic group in the workplace given that the individual is a member of the i th ethnic group is given by γ_w^i . The expected surplus for individual i in the second period who is a member of the majority group is then given by:

$$E_i(S) = \sum_{n=1}^N [(1 - \gamma_w^i) + \gamma_w^i E f(D_i, D_n)] \quad (1)$$

where the expectation is taken over the diversity capital of one's future partners. Conditional on the initial location, the individual's maximization problem is then:

$$\max_{D_i} \sum_{n=1}^N [(1 - \gamma_w^i) + \gamma_w^i E f(D_i, D_n)] - c(D_i, \gamma_j^i) \quad (2)$$

There are important features of the maximization problem above. First, all else equal, individuals would prefer to attend colleges with higher percentages of under-represented minorities as this lowers the cost of acquiring diversity capital. In an extended model where individuals sorted into first-period locations by paying a tuition-like rent, more diverse locations would command higher rents. Hence, that colleges compete for high representations of minority students is consistent with the model. Second, from a social perspective individuals will naturally under-invest in diversity capital. To see this, note that both the majority and the minority individual benefit when the other has groups on interracial interaction might be muted if, for example, the share increase creates a "critical mass" of minority students who independently choose to self segregate, or if increasing the share of minorities on elite campuses entails introducing a mismatch in ability levels or other factors predictive of individual sorting into cliques. Bowen and Bok (1998) present some evidence linking higher black share to the probability of interacting with blacks in college.

more diversity capital. In the individual's maximization problem he does not take into account the positive externalities associated with his investment decision.¹⁰

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 preferential admissions for minority students are justifiable as restitution for past discrimination.

If the collegiate contribution to diversity capital depends on minority student characteristics beyond their mere number, preferential admissions for minority students may or may not be a desirable policy from an efficiency perspective. If diversity capital contributions are greater when students of different races tend to have different ability levels, the argument for preferential admissions is stronger. If, on the other hand, contributions are lessened when disparities in ability levels exist, the argument for preferential admissions is weaker.

Having introduced the concept of diversity capital, it is important to note that we do not intend to test directly for the existence of such a concept in the analysis below. Instead, we are jointly testing the hypothesis that diversity capital matters and minority representation (or self-reported information on the extent of cross-racial interaction) increases it. In some sense, the existence of diversity capital in some form is almost impossible to deny – a traveller in a foreign country, for example, will almost certainly generate more surplus if she can speak the local language and is aware of local bargaining customs. Rather than provide a generalized test, we hope to shed light on a narrower question: whether a specific variable easily manipulated by policy has the potential, through the causal mechanism identified above, to improve an individual's productivity and well-being.

4 Data and Methods

To examine the impact of collegiate diversity on postgraduate outcomes, we employ the College and Beyond Data set, made available by the Andrew W. Mellon Foundation.¹¹ This data set contains

¹⁰This argument also implies that efforts to measure the benefits of collegiate diversity by examining earnings or other measures of surplus may understate the true magnitude of benefits. So long as some positive fraction of the returns to individual diversity capital accrue to the possessor, however, the existence of private returns is a necessary and sufficient condition for the existence of social returns.

¹¹We omit observations from historically black colleges as affirmative action is not relevant at these schools. While in theory inclusion of these institutions could help us identify the impact of racial composition on the outcomes of

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 three cohorts. Our analysis focuses on the 1976 entering cohort, a group that was enrolled at the time of the Supreme Court’s *Bakke* decision.^{12 13}

The administrative data include information on each matriculant’s SAT scores, major subject, and means of exit, whether graduation, transfer, or withdrawal. For most institutions, the administrative data cover the entire population of matriculants, regardless of whether they responded to the follow-up survey. The administrative data permit us to construct a set of characteristics describing each student’s cohort.¹⁴ Cohort characteristics include average SAT scores and racial composition. In the empirical specifications below, we equate diversity with the percent of cohort members who belong to racial or ethnic groups that have been historically under-represented in college: African-Americans, Hispanics, and Native Americans.¹⁵ For brevity, we refer to members of these groups as under-represented minorities (URMs). Figure 1 reveals the extent of variation in URM share across

African-American students, we are particularly concerned that these campuses vary dramatically from the other C&B institutions not only in terms of minority representation, but unobserved indicators of education quality. Moreover, our desire to address the specific issue of spillovers associated with affirmative action policy leads us to focus explicitly on those students who do not directly benefit from the policy.

¹²Other cohorts available in the C&B data set include the classes entering in 1951 and 1989. We omit the 1951 cohort since minority enrollments were universally small at that point in time. We omit the 1989 cohort since the 1996 follow-up survey found a significant fraction who had not yet completed their post-graduate education in 1995.

¹³For most institutions, the administrative data represents the entire entering cohort. For the remainder, the data comprise a nonrandom sample of the student body. Weights are provided to adjust for this sampling. A complete list of institutions represented appears in Table A1 in the appendix.

¹⁴In our specifications examining major-by-college level variation in racial composition, we effectively define a student’s cohort as those peers in the same major at the same institution and recode each student’s major into one of eleven groups for consistency. The eleven categories are: (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) education and other professionally oriented majors. 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. The decision to combine certain disparate majors, such as history and philosophy, was driven by a comparable desire to prevent any individual category from representing only a tiny share of the overall sample. Our results are not sensitive to the categorization of majors, or to the complete disaggregation of majors. Roughly 754 observations are missing information on college major and are therefore omitted from the analysis.

¹⁵Alternative operationalizations of diversity, such as using the fraction of African-American students in the cohort or a Herfindahl-style fractionalization index, yield similar results in all empirical exercises reported below.

the 30 institutions in our sample: a significant number of white and Asian students in the 1976 entering cohort witnessed URM shares below 2%, while others experienced URM shares as high as 13%.

Let i index the individual and j index the school. Our baseline specifications consider outcome Y_{ij} as a function of the characteristics of the individual, X_i , the URM share at the school, SHR_j , other characteristics of the school, Z_j , and an error term, ϵ_{ij} :

$$Y_{ij}^* = \alpha_0 + X_i\alpha_1 + SHR_j\alpha_2 + Z_j\alpha_3 + \epsilon_{ij} \quad (3)$$

This is the specification used in Black, Daniel, and Smith (1997, 2001), which examine a nationally representative sample of colleges. As noted above, our data set focuses on elite colleges where race conscious admissions are most relevant.

As outlined in the introduction, studies such as ours must be concerned with the potential for unobserved determinants of labor market or life satisfaction outcomes that are correlated with the observed factor of interest, in this case minority representation.¹⁶ The correlation coefficient between URM share and average SAT score of the school is above 0.7. If both of these measures are imperfect measures of some true underlying college quality, then we may overstate the effects of URM share on outcomes.

As noted previously, we also estimate models where the effect of minority representation can vary across students. Specifically, we develop a model that nests the relationship between the URM share of outcomes in equation (3) but allows for similarity in SAT scores across the distribution to matter. This permits us to test the hypothesis that white and Asian students benefit most from exposure to URM students at similar – or potentially, dissimilar – ability levels. For each white or Asian student in the sample, we divide URM classmates into three groups: those with SAT scores 160 or more points above their own (*HIGH*), 160 or more points below their own (*LOW*), and within 160 points of their own score (*MED*).¹⁷ Dividing these numbers by the total number of classmates then gives the joint probability of being in the particular SAT group and in the racial group in question. We then allow increasing the shares of each of these groups to differ in their

¹⁶Recent literature has sought to eliminate bias of this sort either by modelling the college choice process (Brewer et al. 1999, Arcidiacono 2004, Arcidiacono 2005), 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 by modeling selection on observables (Black, Daniel, and Smith 1997).

¹⁷160 points corresponds to the standard deviation in SAT scores across the population of College & Beyond students.

effect on postgraduate outcomes. This leads to the following specification:

$$Y_{ij}^* = \alpha_0 + X_i\alpha_1 + \mathbf{SHR}_j\alpha_2 + Z_j\alpha_3 + \epsilon_{ij} \quad (4)$$

where

$$\mathbf{SHR}_j\alpha_2 = \frac{\alpha_{20}N_{jHIGH} + \alpha_{21}N_{jMED} + \alpha_{22}N_{jLOW}}{N_j}$$

N_{jHIGH} refers to the number of students at school j , who have SAT scores 160 points above individual i while N_j refers to the total number of students at school j .

Evidence of heterogeneity in the impact of minority representation on white and Asian outcomes might indicate, as suggested in section 3 above, that the causal impact of exposure to diversity depends on more than just the raw number of other-group members in the student body. There are other potential explanations for any such pattern, however, some causal in nature and others not. In our discussion of empirical results below we will refer to specification checks undertaken to test alternative explanations.

All individuals in the administrative data were surveyed in 1996 with a response rate of around 80%. This survey provides all of our outcome measures, as well as our alternative measure of a student’s exposure to racial diversity. Respondents were asked to report their income, measured categorically on a ten-point scale, their satisfaction with their career, on a five-point Likert-type scale, and their satisfaction with their lives since graduation, again on a five-point scale. We transform income logarithmically, using the midpoint of each income category, with a value equal to 112.5% of the topcode for the highest category.¹⁸ Individuals with zero income are not distinguishable from those with small positive income levels in this survey; results are not sensitive to the imputed value assigned to this group.

The follow-up survey asks matriculants to provide their own subjective estimation of the contribution that their undergraduate experience made to their “ability to work effectively and get along well with people from different races/cultures.” This hypothesized ability conforms relatively well to our conceptualization of diversity capital. We therefore use responses to this survey item as a direct, albeit subjective, measure of the impact of college-era experiences on diversity capital.

¹⁸This is the same imputation method used by Dale and Krueger (2002). Changing the treatment of topcoded income does not substantively influence the results. Estimating earnings models using ordered probits rather than OLS regression also produces qualitatively similar results. Some sample members, who received a pilot survey instrument, have income reported in nine categorical intervals. We use a similar imputation strategy for these respondents.

Responses to this survey item were quite varied: among white and Asian respondents, about one-fifth gave response 5, indicating that their undergraduate experience contributed “a great deal” to their diversity capital. About one-quarter gave responses 3 and 4, one-sixth gave response 2, and one-twelfth gave response 1, indicating that their undergraduate experience contributed nothing to their diversity capital.¹⁹

5 Earnings

We first examine the relationship between earnings and objective diversity measures. We focus on males, though selecting the sample on the basis of labor force participation rather than gender yields similar results. All specifications control for cohort average SAT scores, an indicator for whether the individual is Asian rather than white, and the respondent’s own SAT scores as reported by the institution.

Table 1 examines the effect of within-institution measures of diversity on earnings. The appendix shows the same table except using variation in diversity at the major-by-college level and controlling for institution fixed effects. The first column shows results of a baseline specification using school-level diversity. The effect of URM share is large and negative but imprecisely estimated. The relatively large standard error reflects the small number of independent observations on institutional racial composition in this sample. Taken at face value, the coefficient suggests that a one percentage point increase in the share of under-represented minorities at a university decreases the earnings of white and Asian matriculants by more than 0.8%. Even though the standard error is large, we can rule out large positive effects of diversity on outcomes. Even at the upper limit of the 95% confidence level, the effect of a one percentage point increase in school-level diversity – which would be substantial – is only 0.4%.

Other measures of college quality either have the expected signs or are insignificant. The average SAT math score of the school is positive while the coefficient on the average SAT verbal score of the school is small in magnitude and statistically insignificant. Individual SAT scores are comparably stronger predictors of postgraduate earnings. Consistent with Arcidiacono (2004), we find a split effect of a graduate’s own SAT scores: higher math scores predict higher earnings, but higher verbal scores predict lower earnings.²⁰ The point estimate suggests that Asian matriculants earn less than

¹⁹About 1% of respondents answered “uncertain”; these respondents are excluded from the empirical analysis.

²⁰Arcidiacono (2004) provides an extensive discussion of this seemingly anomalous result. This result has also been

their white counterparts, but the effect is not statistically significant.

The second specification adds a more complete set of control variables, including indicators for educational attainment, sector of employment, and categorical controls for major. Controls for educational attainment and training are common in the literature and we include the sector controls to capture compensating differentials that may be associated with certain types of jobs.²¹ In this specification, the estimated impact of URM share on earnings is still negative but very close to zero. This occurs because URM share proves to be a negative predictor of graduation, as we will show in the next section, and graduation is positively associated with earnings. The added controls also lower magnitudes of the coefficients on the school average SAT scores as well as coefficients on an individual's own SAT scores. Higher educational attainment, with the exception of non-professional graduate degrees, is associated with higher earnings. Workers in the non-profit and government sectors, and those who are self-employed, earn less.

Are these negative point estimates unbiased estimates of the true causal effect of minority exposure on earnings? As discussed in the introduction and subsequently, there are strong reasons to believe they are not. Within our sample, URM share tends to be higher at more prestigious and competitive colleges. This implies that URM share may be correlated with unobserved elements of college quality that positively influence earnings, over and above the impact of peer SAT scores. Our fundamental conclusion for this analysis, then, is that the effect of undergraduate exposure to under-represented minority peers is almost certainly not positive, given that our point estimates exclude all but the smallest positive effects and we suspect that they are upwardly biased.

With no evidence that the aggregate URM share has a positive effect on earnings, we now test whether the effect of exposure to URM students depends on the degree of similarity between white/Asian and URM students. The third and fourth columns of Table 1 test for this heterogeneity by dividing the student body into three unique groups for each white or Asian student. These groups consist of those with significantly higher SAT scores, those with significantly lower SAT scores, and those with similar SAT scores. The estimates in the third and fourth column suggest that if there are benefits to be gained from diversity they accrue through interacting with those who have similar academic background to one's own. While the estimates here are noisy and generally insignificant, we see positive point estimates for the coefficients on URM share among those who have similar SAT scores one's own and negative estimates of the impact of URM share among students with SAT

confirmed in similar studies using different datasets; see, for example Arcidiacono, Cooley and Hussey (2008).

²¹In Table 3 we will pursue this vein further by analyzing variation in job satisfaction directly.

scores either significantly higher or lower than one's own. The estimated effect of the URM share among those with significantly lower SAT scores is statistically significant in column 3, and suggests that an affirmative action-style policy that increased the proportion of low-scoring URMs would by one percentage point would reduce the earnings of moderate-to-high scoring whites and Asians by 1.3%, while having at most a small positive impact on those low-scoring whites not displaced by the program. This coefficient does drop dramatically in magnitude and becomes insignificant when the additional controls are added in column 4. Once again, this can be attributed to the added control for graduation. As we will see in the next section, increasing the URM share of those with significantly lower SAT scores has a significantly negative impact on college graduation rates.

In the appendix we report these same specifications using major-by-college variation and controlling for institution fixed effects. The same patterns emerge. Namely, at an aggregate level the coefficient on URM share was negative and insignificant. Decomposing the effects shows positive signs only for the URM share of similar SAT scores, though none of the coefficients were sufficiently different from zero.

The evidence as a whole suggests that, to the extent that exposure to diversity matters at all, preferential admissions policies for URM students reduce rather than increase the aggregate social benefits associated with diversity. By definition, these policies move minority students away from campuses where their SAT scores would match that of other racial groups and towards campuses where their scores are significantly below those of other racial groups. This pattern could also explain the difference between our results and those of Black, Daniel, and Smith (1997; 2001). Their sample includes a broader array of non-selective universities, where racial differences in SAT scores will in general be less acute than in the highly selective colleges we study.

Although these results are consistent with the view that exposure to similar-scoring URM students is most beneficial, there are at least two alternative explanations. First, exposure to diversity may be most important for low-scoring white and Asian students at elite colleges—those most likely to have URM classmates with similar SAT scores. This could occur because these students will have the most opportunities to profit from interracial interaction after college. We tested this hypothesis by directly interacting own SAT score with URM share. Instead of the negative sign predicted by this alternative explanation, the result is positive.

A second alternative is that low-scoring white and Asian students attending elite colleges that practice more aggressive affirmative action are different from other students along some unobserved

dimension. To test this possibility, we interacted own-SAT score with school average SAT scores. Estimated effects are generally not significant. While it remains possible that below-average white and Asian students perform better only in those colleges with aggressive affirmative action policies, these results argue against any general pattern of an interaction between diversity and superior unobservables for low-scoring white or Asian students.

6 Education and Satisfaction Outcomes

Earnings are the canonical outcome measure in traditional studies of human capital investment and school quality. There are other means of assessing college quality, however. In this section, we use educational attainment measures and self-reported satisfaction measures as outcome measures.

6.1 Minority representation and educational outcomes

The two measures of educational attainment we consider are graduation and attending graduate school, with effects estimated by probit models. The sample in both cases now includes both males and females.²² Although we control for gender, the individual’s own and peer SAT scores (split by math and verbal), and major fixed effects throughout, we only report the coefficients on the diversity measures. Table 3 shows the effects of different diversity measures on the probability of graduating or attending graduate school. The entries in Table 3 have been rescaled to show the marginal effects of a unit increase in an independent variable when all covariates are set equal to their respective means.

The first column of Table 3 relates the aggregate percentage of under-represented minorities to the probability of graduating. The effect of increasing URM share at the institution level is negative and significant: a percentage point increase in URM share is associated with a 0.8 percentage point decline in the probability of graduation. The second column partitions URM share, reporting the impact of increasing the share of classmates who are minority students with higher, comparable, or lower SAT scores. Exposure to higher-scoring URM students is associated with a higher probability of graduation. In contrast with earnings specifications, the impact of exposure to similar-scoring URM students is negative here. However, it is still much less negative—less than half the magnitude—of the effect of exposure to lower-scoring URM students. The estimated decrease in graduation probabilities from a one percentage point increase in the share of lower-scoring URM classmates

²²Estimation on the sample of male matriculants yields comparable results.

is about one percentage point and is statistically significant. As shown in the appendix, negative and significant effects of exposure to lower-scoring URM students also appears when major-by-college variation. The presence of negative effects in these specifications can then explain the patterns observed in Tables 2, where controlling for educational attainment had the effect of making the estimated relationship between URM share and earnings less negative. Once again, given the potential for a positive relationship between URM share and unobserved elements of college quality, we are inclined to think that our estimates, particularly those that analyze aggregate URM share, are biased upwards.

Columns three and four replicate the analysis of the first two columns, replacing the outcome measure with graduate school attendance. There are no significant diversity effects when controlling for aggregate URM share, though the sign is again negative. When we decompose URM share into three categories, we see a positive and quite large effect for the share of higher-scoring URMs at the institution level.²³

Overall, estimates of the effects of diversity on educational outcomes do not support aggressive affirmative action policies. The relationship between aggregate diversity and educational outcomes is consistently negative. Further, the negative and significant effects of URM share significantly below one's own SAT score on the probability of graduating suggests that aggressive affirmative action policies may have negative spillovers rather than positive spillovers for whites and Asians.

6.2 Minority representation and satisfaction outcomes

The estimated relationships between minority representation and the earnings and educational outcomes of whites and Asians may reflect a tendency for some students to pursue careers or lifecourses that offer more nonpecuniary rewards. In this section, we take advantage of two items asked of College & Beyond survey respondents, relating to their overall satisfaction with their job and life.²⁴ Responses varied along a five point scale: the highest response category in each case is "very satisfied," followed by "somewhat satisfied," "neither satisfied nor dissatisfied," "somewhat dissatisfied"

²³This pattern is not replicated in models using major-by-college level variation.

²⁴The use of ordinal satisfaction measures in economic research is neither unprecedented (Clark and Oswald, 1994; Di Tella et al. 2001; Gruber and Mullainathan, 2005) nor uncontroversial (Bertrand and Mullainathan, 2001). As stated above, our use of these measures is motivated primarily by the possibility that increases in individual productivity may not translate entirely into labor market earnings. Using measures of life satisfaction as well as job satisfaction also presents the possibility of measuring returns to individual utility that accrue through nonmarket interaction.

or “very dissatisfied.” We use the same controls here as were used in the section on educational outcomes and add to these measures for the educational outcomes themselves. Our sample includes both males and females for life satisfaction but only males for job satisfaction. Results of ordered probit specifications are reported in Table 3.

The first two columns of Table 3 focus on the relationship between job satisfaction and diversity. Both using an aggregate measure of diversity as well as decomposing diversity by relative SAT score show a negative but insignificant relationship between diversity and job satisfaction. As shown in the appendix, this is the only time when looking at the major-by-college level changes the results. When URM share is calculated at the major-by-college level we see positive and sometimes significant relationship between increasing diversity and job satisfaction, with the strongest results actually coming from increasing diversity among those with significantly lower SAT scores. While this could indicate that exposure to lower-performing URM students leads to an increase in the nonpecuniary rewards of work, it might also indicate that such exposure changes the subjective scaling that graduates use to map their true satisfaction level into a five-point scale.

Columns three and four examine the relationship between life satisfaction and earnings. Aggregate URM share has a negative and significant relationship with life satisfaction. Splitting out diversity into the three groups shows similar patterns to the results on earnings. Namely, increasing the URM share of those with similar SAT scores has a positive relationship with life satisfaction. In contrast, increasing the URM share for those who have significantly higher or significantly lower SAT scores has a negative relationship with life satisfaction. Analysis at the major-by-college level shows similar patterns, though the only significant relationship is for the coefficient on the URM share with similar SAT scores. These results are consistent with the notion that minority representation has a positive impact primarily among those white and Asian students with similar academic backgrounds. As with earlier results, these imply that policies that introduce disparities between the academic backgrounds of minority and non-minority students are unlikely to generate benefits for non-minorities, and may in fact be costly in the aggregate.

7 Self-reported Gains in Diversity Capital and Outcomes

The previous sections analyzed how objective measures of diversity translated into earnings, education, and satisfaction outcomes. It is possible, however, that these measures fail to capture the representation of minority students in the most important campus subgroups, whether defined by

residence, social circle, or extra-curricular activity. To address this concern, we now examine an alternative measure of a college’s contribution to diversity capital: graduates’ self-reported perceptions of how their school influenced their ability to work with individuals of other races. In particular, we replace the minority representation measures used in the previous sections of the paper with self-reported ordinal data on the contribution an individual’s undergraduate education made to their “ability to work effectively and get along well with people from different races/cultures.” We assume that this measure is synonymous with diversity capital.²⁵ Throughout, we control for institution fixed effects, the student’s subjective estimates the institution’s contribution to fourteen other forms of human capital,²⁶ as well as the other controls used in the previous sections of the paper. Results are shown in Table 4.

The first column of Table 4 shows the results for earnings. Here, we control for the variables in the second column of Table 1 (graduation, MD, JD, etc.) but removing these controls does not change the results. Earnings fall monotonically, as the student’s rating of the collegiate contribution to diversity capital increase, with those who report the highest rating seeing 14% lower earnings than those who report the lowest rating.

This pattern of higher contributions to diversity capital leading to worse outcomes holds not only for earnings, but for all of the outcome equations. The second and third columns shows the results for graduation and receipt of a post-graduate degree. Those giving the highest rating for

²⁵Minority representation within a student’s major is a significant predictor of this subjective diversity capital investment measure, but it explains only a small fraction of the variance in the measure. In an ordered probit regression, major-level URM share has a positive coefficient with a p -value of 0.065, controlling for institution and major fixed effects. The pseudo- R^2 for this specification is 0.013. Thus, it seems plausible that minority representation within a student’s institution or major would be a very imprecise indicator of an undergraduate’s diversity capital investment.

²⁶It is reasonable to be concerned that subjective estimates of college’s contribution to diversity capital are correlated with the respondent’s opinion regarding other aspects of their college education. Particularly successful respondents may feel, rightly or wrongly, that their college contributed a great deal to every component of their human capital. The College and Beyond survey instrument collects subjective estimates of the impact a respondent’s college had on 14 other personal qualities that can be considered components of human capital. The human capital components contributing positively to earnings include competitiveness, leadership abilities, the ability to work cooperatively, the ability to work independently, the ability to have a good rapport with people holding different beliefs, and the ability to form and retain friendships. Human capital components contributing negatively to earnings, aside from diversity capital, include knowledge of a particular field/discipline, the ability to write clearly and effectively, religious values, the ability to adapt to change, and the ability to communicate well orally.

collegiate contribution to diversity capital see probabilities of graduating that are three percentage points lower than those who gave the lowest rating. The numbers are even starker for receiving a post-graduate degree with those giving the highest rating over seven percentage point less likely to receive one than those who gave the lowest rating. Similar results hold for the job and life satisfaction outcomes reported in the fourth and fifth columns: higher ratings for the collegiate contribution to diversity capital are associated with significantly lower job and life satisfaction.

The uniformity of the effect of perceived diversity capital and these outcome measures is striking. In all cases the “ability to work effectively and get along with people from different races/cultures” has a negative effect on outcomes. This suggest that colleges which invest significant resources to programs of diversity training, including but not limited to affirmative action, could improve their graduate’s lives by reallocating those resources.

8 Conclusions

Do white and Asian students at elite schools benefit from the presence of under-represented minority students on campus or in the college classroom? While not all the evidence in this paper suggests that interracial exposure is uniformly negative, it strongly suggests that the predominant policy tool designed to increase the representation of minority groups, affirmative action, has a negative net impact on students not directly targeted by the program.

Our empirical results cover a broad range of outcomes, including earnings, educational attainment, and satisfaction with both one’s life and one’s job. Across these varying specifications, we fail to find any significant evidence that white or Asian students who attend more diverse colleges do better later in life. Our point estimates are most often negative, and the effects are estimated precisely enough to rule out all but inconsequential positive effects. Moreover, the likely correlation of minority share with unobserved positive elements of college quality implies that our estimates are not negative enough. Further analysis suggests that affirmative action is actually counterproductive, if its goal is to improve the productivity of majority-race students. Preferential admission policies by definition reduce the degree of similarity in credentials across races on each individual campus. Our evidence indicates that the impact of exposure to minority students with lower credentials is if anything negative. We also find persistent negative associations between white and Asian students’ self-reported experiences of diversity on campus and postgraduate outcomes.

Students attending colleges with weak affirmative action policies, or with more general difficulties

in attracting students from under-represented minorities, suffer no ill effects in the marketplace. The efficiency rationale for affirmative action, espoused by Lewis Powell and later observers, is in reality inconsistent with the most basic evidence. Preferential admissions for certain groups may still have a role in higher education, but they should be understood for what they are: redistributive mechanisms that create benefits for the targeted racial groups but costs for others.

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Table 1: Minority enrollment and earnings, 1976 White and Asian male C&B matriculants

Independent variable	Dependent variable: ln(earned income, 1995)			
	Institution-level cohorts			
URM share in cohort	-0.857 (0.643)	-0.088 (0.500)	-	-
URM share among students with significantly higher SAT scores	-	-	-0.900 (2.082)	-0.683 (1.708)
URM share among students with comparable SAT scores (+/- 160 points)	-	-	0.402 (1.148)	0.332 (0.783)
URM share among students with significantly lower SAT scores	-	-	-1.333** (0.619)	-0.247 (0.488)
Entering cohort average SAT math score (/100)	0.401** (0.170)	0.186 (0.135)	0.345** (0.164)	0.168 (0.126)
Entering cohort average SAT verbal score (/100)	-0.086 (0.130)	0.006 (0.102)	-0.071 (0.124)	0.016 (0.095)
Own SAT math score (/100)	0.086** (0.015)	0.054** (0.014)	0.100** (0.013)	0.057** (0.013)
Own SAT verbal score (/100)	-0.089** (0.016)	-0.079** (0.012)	-0.073** (0.019)	-0.075** (0.016)
Asian	-0.064 (0.044)	-0.007 (0.027)	-0.063 (0.044)	-0.007 (0.028)
Graduated from matriculating institution	-	0.204** (0.050)	-	0.203** (0.050)
Any graduate degree	-	-0.044* (0.024)	-	-0.043* (0.024)
MBA degree	-	0.328** (0.029)	-	0.327** (0.029)
JD degree	-	0.428** (0.046)	-	0.428** (0.045)
MD degree	-	0.953** (0.029)	-	0.952** (0.030)
Nonprofit sector	-	-0.469** (0.030)	-	-0.468** (0.030)
Government employee	-	-0.464** (0.026)	-	-0.464** (0.027)
Self-employed	-	-0.191** (0.034)	-	-0.192** (0.034)
Major category fixed effects	Yes	Yes	Yes	Yes
N	9250	9225	9250	9225
R ²	0.056	0.212	0.056	0.212

Note: Standard errors, corrected for potential correlation within 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.

** denotes a coefficient significant at the 5% level, * the 10% level.

Table 2: Diversity and educational outcomes

Independent variable	Dependent variable: indicator for graduation from matriculating institution		Dependent variable: indicator for receipt of any postgraduate degree	
	Institution-level cohorts			
URM share	-0.801** (0.368)	-	-0.357 (0.657)	-
URM share among students with significantly higher SAT scores	-	0.047 (1.015)	-	2.285** (1.086)
URM share among students with comparable SAT scores (+/- 160 points)	-	-0.439 (0.440)	-	-0.947 (0.860)
URM share among students with significantly lower SAT scores	-	-1.051** (0.414)	-	-0.306 (0.626)
N	25155	25155	18184	18184
Pseudo-R ²	0.176	0.177	0.075	0.075

Note: Table entries are probit coefficients, scaled to represent marginal effects of a one-unit change in the independent variable when other independent variables are set equal to their respective means. Standard errors, corrected for potential correlation within institutions, appear in parentheses. All specifications control for individual SAT math and verbal scores, major cohort mean math and verbal scores, major category fixed effects, and indicator variables for race and gender. Data source is the College and Beyond survey of the 1976 entering cohort. Sample is restricted to white and Asian matriculants. Observations are weighted using C&B survey weights.

** denotes a coefficient significant at the 5% level, * the 10% level.

Table 3: Diversity and subjective satisfaction measures

	Dependent variable: ordinal measure of satisfaction with job held in 1995 (5-point scale)		Dependent variable: ordinal measure of life satisfaction (5-point scale)	
Independent variable	Institution-level cohorts			
URM share	-0.603 (0.478)	-	-1.016** (0.462)	-
URM share among students with significantly higher SAT scores	-	-0.172 (1.399)	-	-2.595** (1.156)
URM share among students with comparable SAT scores (+/- 160 points)	-	-0.656 (0.796)	-	1.277* (0.754)
URM share among students with significantly lower SAT scores	-	-0.731 (0.590)	-	-1.772** (0.598)
N	9308	9308	18155	18155
Pseudo-R ²	0.006	0.006	0.004	0.004

Note: Table entries are ordered probit coefficients. Standard errors, corrected for potential correlation within institutions, appear in parentheses. All specifications control for individual SAT math and verbal scores, major cohort mean math and verbal scores, major category fixed effects, and indicator variables for race and gender. Data source is the College and Beyond survey of the 1976 entering cohort. Sample is restricted to white and Asian matriculants. Observations are weighted using C&B survey weights.

** denotes a coefficient significant at the 5% level, * the 10% level.

Table 4: Subjective measures of collegiate contributions to diversity capital and outcomes

Independent variable	Dependent variable: ln(earned income, 1995)	Dependent variable: indicator for graduation from matriculating institution	Dependent variable: indicator for receipt of any postgrad. degree	Dependent Variable: ordinal measure of satisfaction with job held in 1995 (5-point scale)	Dependent variable: ordinal measure of life satisfaction (5-point scale)
Respondent rates collegiate contribution to diversity capital as 2 on a 5-point scale	-0.036 (0.040)	-0.006 (0.006)	-0.014 (0.022)	-0.048 (0.062)	0.021 (0.052)
Respondent rates collegiate contribution to diversity capital as 3 on a 5-point scale	-0.073* (0.040)	-0.011 (0.007)	-0.024 (0.024)	-0.121 (0.074)	-0.022 (0.055)
Respondent rates collegiate contribution to diversity capital as 4 on a 5-point scale	-0.119** (0.045)	-0.017** (0.008)	-0.059** (0.024)	-0.094 (0.078)	-0.043 (0.056)
Respondent rates collegiate contribution to diversity capital as 5 on a 5-point scale	-0.140** (0.050)	-0.030** (0.011)	-0.072** (0.028)	-0.186** (0.083)	-0.130** (0.059)
Institution fixed effects	Yes	Yes	Yes	Yes	Yes
Major category fixed effects	Yes	Yes	Yes	Yes	Yes
Controls for subjective estimates of collegiate contribution to 14 other forms of human capital	Yes	Yes	Yes	Yes	Yes
N	8434	16339	16310	8497	16279
R ²	0.249	0.310	0.102	0.023	0.025

Note: Standard errors in parentheses. Diversity capital is defined as the “ability to work effectively and get along well with people from different races/cultures.” Data source is the College and Beyond survey of the 1976 entering cohort. Sample is restrictions depend on the outcome measure and are defined as in the previous tables. Observations are weighted using C&B survey weights.

** denotes a coefficient significant at the 5% level, * the 10% level.

Figure 1

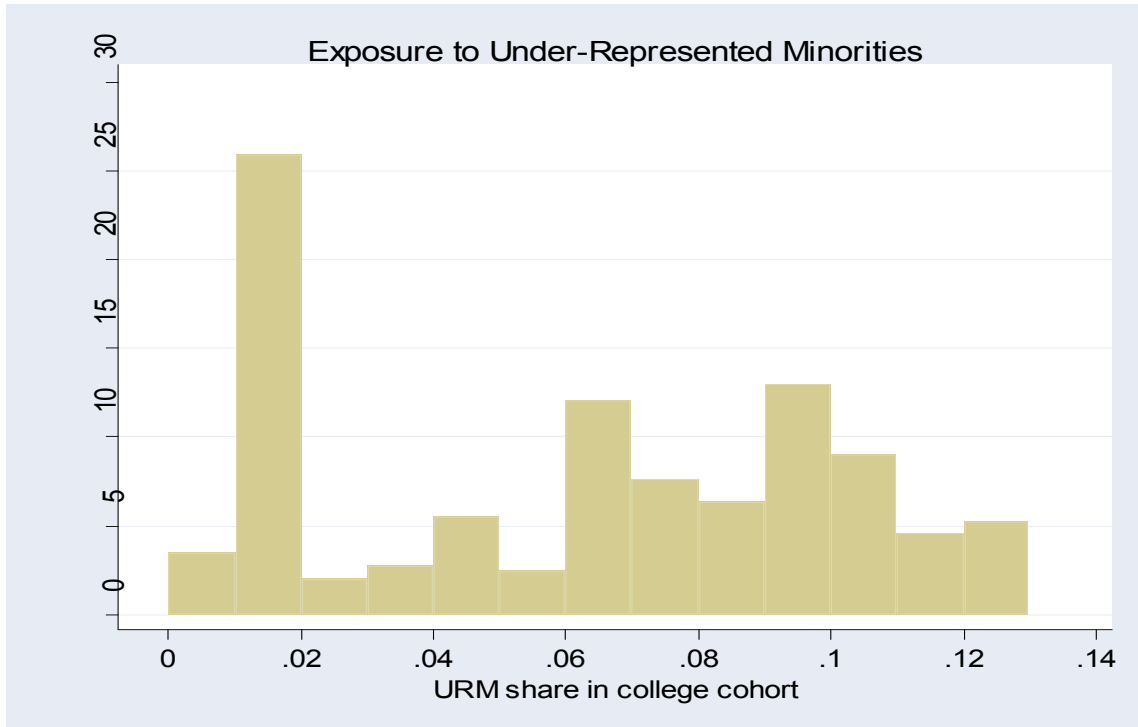


Figure 2

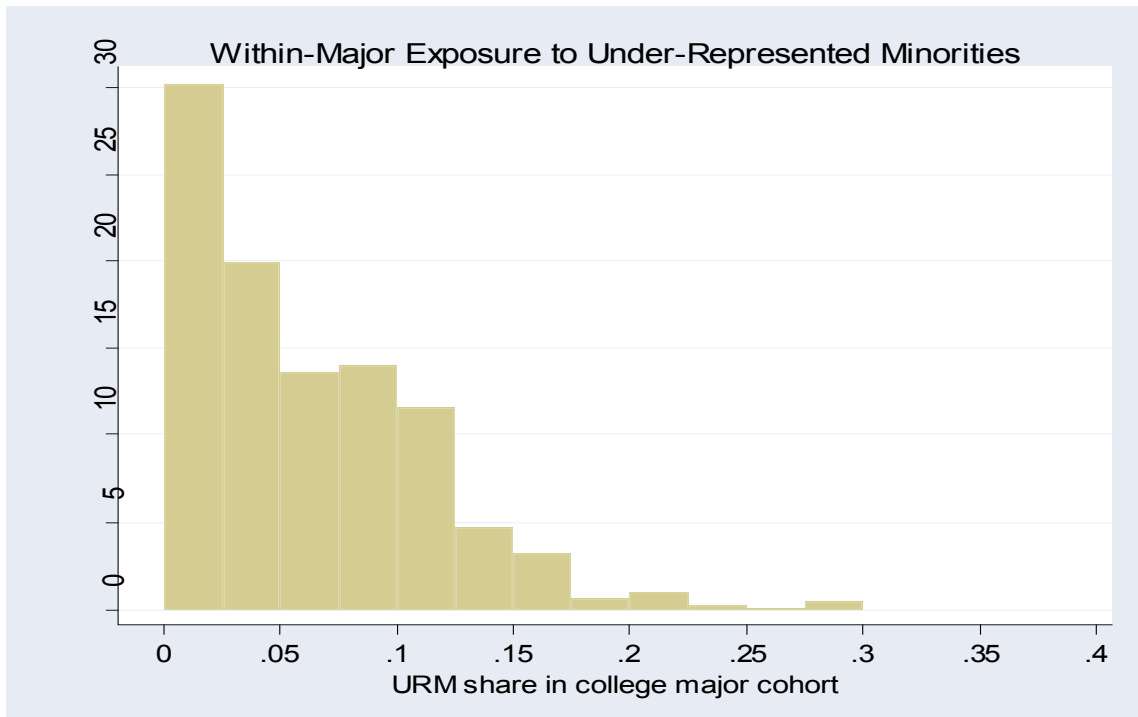


Table A1: List of institutions represented in the College and Beyond database

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

Table A3: Summary Statistics

Variable	Obs.	Mean	Std. Dev.
ln(earned income, 95)	10,004	11.16	0.865
URM share at undergraduate institution	28,255	6.10%	3.61%
Over 160 points above own SAT score	28,255	0.62%	1.20%
Within 160 points of own SAT score	28,255	2.22%	2.65%
Over 160 points below own SAT score	28,255	3.74%	2.90%
Entering cohort average SAT math score (/100)	28,255	5.684	0.677
Entering cohort average SAT verbal score (/100)	28,255	5.258	0.686
Own SAT math score (/100)	28,255	6.109	0.916
Own SAT verbal score (/100)	28,255	5.639	0.940
Graduated from matriculating institution	28,255	0.798	—
Received any postgraduate degree	19,788	0.539	—
Respondent rates collegiate contribution to diversity capital as 2 on a 5-point scale	19,538	0.171	—
Respondent rates collegiate contribution to diversity capital as 3 on a 5-point scale	19,538	0.280	—
Respondent rates collegiate contribution to diversity capital as 4 on a 5-point scale	19,538	0.277	—
Respondent rates collegiate contribution to diversity capital as 5 on a 5-point scale	19,538	0.187	—
Career satisfaction ratings (on a 5-point scale):			
5 (highest)	10,054	0.502	—
4	10,054	0.370	—
3	10,054	0.032	—
2	10,054	0.066	—
Life satisfaction ratings (on a 5-point scale):			
5 (highest)	19,758	0.441	—
4	19,758	0.454	—
3	19,758	0.037	—
2	19,758	0.057	—

Note: Sample for both log earnings and career satisfaction includes only males. All means are conditional on having valid observations for SAT scores and are conditional on being White or Asian.

Table A4: Minority enrollment and earnings, 1976 White and Asian male C&B matriculants

Independent variable	Dependent variable: ln(earned income, 1995)			
	Major-level cohorts			
URM share in cohort	-0.198 (0.420)	-0.222 (0.325)	-	-
URM share among students with significantly higher SAT scores	-	-	-1.405 (1.209)	-0.848 (1.002)
URM share among students with comparable SAT scores (+/- 160 points)	-	-	0.721 (0.528)	0.536 (0.458)
URM share among students with significantly lower SAT scores	-	-	-0.420 (0.481)	-0.445 (0.385)
Entering cohort average SAT math score (/100)	0.327** (0.142)	0.154** (0.074)	0.331** (0.144)	0.153** (0.074)
Entering cohort average SAT verbal score (/100)	-0.123 (0.100)	-0.100 (0.082)	-0.126 (0.099)	-0.101 (0.082)
Own SAT math score (/100)	0.078** (0.016)	0.049** (0.014)	0.083** (0.016)	0.055** (0.015)
Own SAT verbal score (/100)	-0.086** (0.014)	-0.076** (0.013)	-0.080** (0.016)	-0.069** (0.014)
Asian	-0.057* (0.030)	-0.004 (0.030)	-0.056* (0.030)	-0.004 (0.030)
Graduated from matriculating institution	-	0.221** (0.036)	-	0.219** (0.036)
Any graduate degree	-	-0.037 (0.027)	-	-0.037 (0.027)
MBA degree	-	0.317** (0.030)	-	0.317** (0.030)
JD degree	-	0.415** (0.034)	-	0.415** (0.034)
MD degree	-	0.929** (0.037)	-	0.930** (0.037)
Nonprofit sector	-	-0.466** (0.033)	-	-0.466** (0.033)
Government employee	-	-0.459** (0.023)	-	-0.458** (0.023)
Self-employed	-	-0.189** (0.029)	-	-0.189** (0.029)
Institution fixed effects	Yes	Yes	Yes	Yes
Major category fixed effects	Yes	Yes	Yes	Yes
N	9250	9225	9250	9225
R ²	0.073	0.220	0.074	0.221

Note: Standard errors, corrected for potential correlation within majors, appear in parentheses. Data source is the College and Beyond survey of the 1976 entering cohort. Observations are weighted using C&B survey weights. ** denotes a coefficient significant at the 5% level, * the 10% level.

Table A5: Diversity and educational outcomes

Independent variable	Dependent variable: indicator for graduation from matriculating institution		Dependent variable: indicator for receipt of any postgraduate degree	
	Major-level cohorts			
URM share	-0.196 (0.247)	-	-0.100 (0.226)	-
URM share among students with significantly higher SAT scores	-	0.239 (0.343)	-	0.079 (0.451)
URM share among students with comparable SAT scores (+/- 160 points)	-	0.195 (0.195)	-	-0.078 (0.264)
URM share among students with significantly lower SAT scores	-	-0.486** (0.233)	-	-0.127 (0.239)
N	25155	25155	18184	18184
Pseudo-R ²	0.227	0.230	0.087	0.087

Note: Table entries are probit coefficients, scaled to represent marginal effects of a one-unit change in the independent variable when other independent variables are set equal to their respective means. Standard errors, corrected for potential correlation within majors, appear in parentheses. All specifications control for individual SAT math and verbal scores, major cohort mean math and verbal scores, major category fixed effects, and indicator variables for race and gender. All specifications control for institution fixed effects. Data source is the College and Beyond survey of the 1976 entering cohort. Sample is restricted to white and Asian matriculants. Observations are weighted using C&B survey weights.

** denotes a coefficient significant at the 5% level, * the 10% level.

Table A6: Diversity and subjective satisfaction measures

Independent variable	Dependent variable: ordinal measure of satisfaction with job held in 1995 (5-point scale)		Dependent variable: ordinal measure of life satisfaction (5-point scale)	
	Major-level cohorts			
URM share	0.882* (0.485)	-	0.236 (0.264)	
URM share among students with significantly higher SAT scores	-	0.585 (1.211)	-	-1.332 (0.899)
URM share among students with comparable SAT scores (+/- 160 points)	-	0.241 (0.711)	-	1.360** (0.458)
URM share among students with significantly lower SAT scores	-	1.018* (0.532)	-	-0.011 (0.303)
N	9308	9308	18155	18155
Pseudo-R ²	0.008	0.008	0.005	0.006

Note: Table entries are ordered probit coefficients. Standard errors, corrected for potential correlation within majors, appear in parentheses. All specifications control for individual SAT math and verbal scores, major cohort mean math and verbal scores, major category fixed effects, and indicator variables for race and gender. All specifications control for institution fixed effects. Data source is the College and Beyond survey of the 1976 entering cohort. Sample is restricted to white and Asian matriculants. Observations are weighted using C&B survey weights.

** denotes a coefficient significant at the 5% level, * the 10% level.