Asian American Discrimination in Harvard Admissions*

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Abstract

Using detailed admissions data made public in the *SFFA v. Harvard* case, we examine how Asian American applicants are treated relative to similarly situated white applicants. Our preferred model shows that typical Asian American applicants would see their average admit rate rise by 19%, or approximately 1 percentage point, if they were treated as white applicants. We show that one of the channels through which Asian Americans are penalized is the personal rating and that including the personal rating cuts the Asian American penalty by less than half. While identifying the causal impact of race using observational data is challenging because of the presence of unobservables, this concern is mitigated in our setting. There is limited scope for omitted variables to overturn the result because (*i*) Asian Americans are substantially stronger than whites on the observables associated with admissions and (*ii*) the richness of the data yields a model that predicts admissions extremely well.

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1 Introduction

For years, there has been a perception that Asian American applicants to elite US colleges and universities are held to a higher standard than similarly situated white applicants (Golden, 2006; Fuchs, 2019). Despite this public perception, empirical work on the topic is scarce, primarily due to lack of data. Universities tightly guard access to admissions data, and even the criteria by which universities score their applicants is often unknown. The *SFFA v. Harvard* case provided unprecedented access to Harvard's admissions process. Using information made public through this lawsuit, we show that Asian American applicants are penalized relative to their observationally-equivalent white counterparts.

The data we analyze covers six admissions cycles for applicants who, if they were to graduate in four years, would have done so as the Classes of 2014–2019. The Harvard admissions data is exceptionally rich. In addition to many demographic, geographic, and academic measures, the data include information on internal Harvard ratings that influence admissions decisions. These include Harvard admissions officers' ratings of the applicants overall as well as ratings on academics, extracurriculars, athletics, and personal qualities. It also includes the admissions officers' ratings of the letters submitted by high school counselors and teachers. Finally, the data include information on alumni interviews of the applicants in the form of an overall score and a personal score.

In this paper, we focus on typical Harvard applicants, or applicants who do not belong to one of the following groups: recruited athletes, legacies, donor connections, and children of faculty and staff (ALDC). These special applicants are predominantly white, receive large preferences in admissions, and are evaluated differently than typical applicants.[1] Our primary sample excludes these special groups in an effort to make reasonable comparisons across similarly situated applicants. Importantly, more than 97% of Asian American applicants are not ALDC, meaning that our sample covers the overwhelming majority of Asian American applicants. However, we also show that our key findings regarding Asian American discrimination are robust to the inclusion of ALDCs.

Among typical applicants, Asian Americans actually have a slightly higher unconditional

[1] See Arcidiacono, Kinsler, and Ransom (2022) for details on the racial composition of ALDC applicants and how they are treated differently in Harvard's admissions process.

admit rate than whites. But as we show in Section 3, these unconditional admit rates mask substantial differences in qualifications between the two groups. While it is widely understood that Asian American applicants are academically stronger than whites, it is startling just how much stronger they are. During the period we analyze, there were 42% more white applicants than Asian American applicants overall. Yet, among those who were in the top ten percent of applicants based on grades and test scores, Asian American applicants outnumbered white applicants by more than 45%.[2]

Of course, Harvard values more than just academics. And here, too, Asian American applicants as a whole perform as well or better than white applicants on most of Harvard's ratings. But Harvard's ratings may also be affected by racial preferences and penalties. Indeed, Harvard acknowledges that race, in the form of preferences for under-represented minority groups (URMs), is one of the inputs into the overall rating (Day 4 Trial Transcript, p. 50).[3] Consistent with this, we find large racial gaps in the assignment of the overall rating conditional on academic strength. Similar patterns hold for the personal rating, suggesting that this measure is also directly influenced by race. Further, we show that racial groups who have observed characteristics associated with lower overall and personal ratings score higher on these ratings, again suggesting a direct role of race.

We estimate a model of Harvard admissions that aims to uncover the causal influence of Asian American status. Given our findings that race influences both the overall and personal ratings, our preferred model of admissions, described in Section 4, excludes both of these ratings. That said, we include numerous other variables that would capture differences in the non-academic attributes of the applicant pool. The set of controls available far outnumbers

[2]A similar pattern exists at Yale University. According to a litigation complaint (Document 1), there were 35% more white applicants as compared to Asian American applicants in 2017 and 2018. However, among the top ten percent of applicants based on grades and test scores, Asian American applicants outnumbered white applicants by 85%. Also similar to Harvard, white applicants in the top deciles of grades and test scores are admitted at significantly higher rates than their Asian American counterparts. For example, in the top decile of academic strength white applicants are admitted at a rate of 20.2%, while Asian American applicants are admitted at a rate of 14.3% (see p. 23).

[3]Past US Supreme Court rulings allow universities to enact affirmative action to increase the representation of URM applicants. For this reason, we focus primarily on comparisons between Asian American and white applicants, since neither of these groups should be impacted by affirmative action. However, we keep African American and Hispanic applicants in our sample since they help illustrate when and where racial preferences are active in Harvard's admission process. In Online Appendix E.2.1 we illustrate that estimating a model with just white and Asian American applicants also results in a statistically significant penalty against Asian Americans.

past work on admissions and, as a result, the model fits the data extremely well.[4]

Our preferred admissions model shows a substantial penalty against Asian American applicants relative to their white counterparts. The average marginal effect of being Asian American is -1 percentage point. Given that the overall admit rate for Asian Americans is around 5 percent, removing the penalty would increase their admissions chances by roughly 19%.[5] Even if the personal rating is included in the model, the statistical case for a penalty against Asian Americans remains, with the penalty declining by less than half.[6]

We identify the effect of race on admissions using a selection-on-observables approach. The concern with this methodology is that race can proxy for differences in unobserved factors not fully captured by applicant characteristics and Harvard ratings. To avoid concerns about omitted variable bias, researchers have often turned to audit and correspondence studies in other economic settings where racial discrimination is a concern. However, this approach is infeasible for college admissions in the United States because it would be impractical to generate fictitious applicants to the level of detail that admissions offices review applicants.[7] Alternatively, researchers have exploited differential patterns in outcomes across groups to address concerns about unobserved factors when estimating racial disparities in decision making.[8] This approach is typically employed in settings where limited data expands the

[4]Previous work on college admissions primarily uses third party data which contains basic controls such as race, gender, test scores, and athlete/legacy status. Examples include Hurwitz (2011), Long (2004), Espenshade, Chung, and Walling (2004), and Espenshade and Chung (2005). An exception is Bhattacharya, Kanaya, and Stevens (2017), who have access to admissions data for a selective UK university that includes not only test scores, but also interview and essay scores.

[5]Our finding of a 19% penalty is large, considering the magnitude of other penalties in the discrimination literature. As a common example, consider the gender wage gap. The unconditional gender gap in earnings for full-time workers in the United States is approximately 20%, with the gap narrowing to roughly 9% after adjusting for a battery of worker and job characteristics (Blau and Kahn, 2017).

[6]Furthermore, Harvard's Office of Institutional Research (OIR) estimated a number of admission models which all found a significant Asian American penalty (Trial Exhibit P009 and Trial Exhibit P028).

[7]In addition to test scores, high school GPA, and demographic characteristics, applicants must also submit lengthy personal statements, teacher recommendation letters, and counselor recommendation letters. Further, at the most elite schools the majority of applicants interview with alumni. The US admissions system contrasts with that of many other countries, where an entrance exam is the main determining factor of admission. For studies of college admissions in other countries, see Ding and Lehrer, 2007 and Jia and Li, 2017 (China); Ketel et al., 2016 (Netherlands); Kirkeboen, Leuven, and Mogstad, 2016 (Norway); and Bordon and Fu, 2015 and Zimmerman, 2014, 2019 (Chile).

[8]See Bhattacharya, Kanaya, and Stevens (2017) in the context of college admissions. This approach has been used more commonly in the criminal justice setting, including Knowles, Persico, and Todd (2001), Anwar and Fang (2006), and Arnold, Dobbie, and Yang (2018). These methods often rely on strong assumptions about the underlying preferences of the decision maker (Canay, Mogstad, and Mountjoy, 2020).

scope for unobserved factors to overturn the impact of race.

While neither of these approaches are available to us, concerns about omitted variable bias are significantly reduced in our setting. The richness of the applicant data yields a model of admissions outcomes that matches the data incredibly well. The Pseudo R^2 of our preferred model is equal to 0.56, a value well above what is considered an excellent fit (McFadden, 1979). For comparison purposes, Espenshade, Chung, and Walling (2004) estimate racial preferences in elite college admissions and obtain a Pseudo R^2 of around 0.2. In Section 4 we provide further insight regarding the fit of our model by mapping our Pseudo R^2 value to model accuracy and a more traditional R^2 measure.

Not only is there limited scope for omitted variable bias, the evidence suggests that, if anything, we are likely understating the direct penalty Asian Americans face in the admissions process. Asian American applicants are significantly stronger than white applicants on the observable characteristics—outside of race—that Harvard values when making admissions decisions. While there may be differences in unobservables as well, researchers typically assume that groups that are stronger on the observed characteristics are also likely to be strong on the unobserved characteristics.[9] However, in our case, the estimated effect of being Asian American is negative *despite* Asian Americans being positively selected on the academic *and* non-academic observables associated with admission. Thus, if we were to follow the literature and assume Asian American applicants are also stronger on the unobserved factors affecting admission, the actual penalty would be larger than our estimates indicate.

Since this paper relies on reports from the *SFFA v. Harvard* case, it is important to note that Harvard's expert reached a different conclusion on whether Asian Americans were discriminated against in Harvard's admissions process. In Online Appendix E, we outline the key differences in the analysis and why we believe our approach to be correct. But it is essential to point out that, taking all the modeling choices of Harvard's expert and simply removing the personal rating shows a significant admissions penalty against Asian Americans.[10]

[9]Indeed, that selection on observed characteristics moves in the same direction as selection on unobserved characteristics provides the motivation for the empirical approaches of Altonji, Elder, and Taber (2005), Krauth (2016), and Oster (2019).

[10]See Exhibit 21 of Document 419-141 and direct testimony on pages 8–10 of Day 14 Trial Transcript.

Throughout the paper we discuss the copious amounts of evidence that the personal rating is directly influenced by an applicant's race. In particular, (*i*) *every* model of the personal rating shows a significant penalty against Asian Americans, (*ii*) Asian Americans are stronger on the observables associated with the personal rating, and (*iii*) the personal and overall ratings (where race explicitly plays a role) are the only ones where the ordering of the race coefficients is the opposite of the strength of the racial groups on the observables. Given all the evidence, it is clear that the personal rating is an improper control in a model of admissions focused on estimating racial preferences. Accepting Harvard's argument that the personal rating is an appropriate control provides a blueprint for how to discriminate both in admissions and in the workplace: simply create a rating to penalize the targeted group.

2 Data and Admissions Process

Our primary data source is applicant-level data from the Classes of 2014–2019 produced by Harvard in the *SFFA v. Harvard* lawsuit. However, due to court protections, we do not use this data directly. Rather, we rely on publicly available documents such as expert witness reports or internal admissions office memos that were made public as part of the lawsuit. Among these publicly available documents, we rely most heavily on the plaintiff's expert witness rebuttal report (Document 415-9).[11]

In all, the data used in Document 415-9 consist of 142,728 typical domestic applicants who have complete application data.[12] For each applicant, the data contain details on academics, demographics, geography, ALDC status, and a host of other variables (e.g. parental education, whether the applicant applied for financial aid, etc.). As mentioned in the introduction, we exclude ALDC applicants from our analysis, meaning we estimate racial preferences and penalties only for typical applicants. As Online Appendix A makes clear, it is possible to ob-

[11] For a complete list of legal documents we rely on in this paper, see Online Appendix Table F1.

[12] Domestic applicants are those who are either US citizens or permanent residents. There are certainly some applicants who attend high school in the US who are not domestic applicants. There are also some US citizens who attend high school overseas. Trial Exhibit DX 042 shows annual application, admission and matriculation rates by race/ethnicity for the Classes of 2000–2017. During the period of our data, internationals make up about 18% of the applicant pool and about 11% of the admitted class.

tain consistent estimates for typical applicants while excluding ALDC applicants even when they compete for the same admissions slots.

There are four main ethnic groups that make up Harvard's application pool: whites, Asian Americans, African Americans, and Hispanics.[13] While there is significant variation within ethnic groups (e.g. Laotian American vs. Korean American), we aggregate to these main categories because the available documentation suggests that Harvard does the same (see Trial Exhibit DX 042 and Trial Exhibit P164). Around 8% do not report their race, with some evidence that this group is disproportionately white and Asian American (Document 415-8, p. 81). These applicants remain in the estimation sample and are treated as a separate racial group.

Harvard admissions officers read each application and assign three classes of ratings: (*i*) overall; (*ii*) the profile ratings, which include the academic, extracurricular, athletic, and personal ratings; and (*iii*) the school support ratings which include the counselor rating and typically two teacher ratings. In addition, most Harvard applicants are also interviewed in person by an alumnus or alumna who lives close to their high school. The alumni rate applicants on a number of qualities, but only the overall and personal rating are included in the database. Ratings typically take on values between 1 and 5, with 1 being the best. Harvard's internal admission ratings are included in the applicant-level data.

Trial Exhibit P001 contains a summary of the criteria by which ratings are assigned for the Class of 2018. Among the profile ratings, the criteria for evaluating academics and extracurriculars are straightforward and generally coincide with what one would expect. The personal rating, which is meant to capture personal qualities such as likeability, courage, and kindness, is the most vague.[14] The reading procedures instruct the reader to score a 1 if the

[13]Harvard also keeps track of Native Americans and Pacific Islanders, but these groups are too small to be separately analyzed, so we classify them as "other." We also create a separate category for those who fail to report any race or ethnicity. We classify multiracial students in the same way Harvard does (Document 415-8, p. 92). Multiracial students who have any amount of African ancestry are coded as African American, those with any amount of Hispanic ethnicity are coded as Hispanic (but African-American Hispanics would be coded as African American), then those with any amount of Asian ethnicity are coded as Asian American (so that half-Asian half-white would be coded as Asian), and finally whites are those whose ethnicity is only white.

[14]Harvard revised their reader guidelines the summer before the trial, providing much clearer guidance on the scoring of the personal rating. In contrast to previous reader guidelines, the 2023 reader guidelines explicitly state that race should not be considered when assigning the personal rating. See Trial Exhibit P633.

applicant's personal qualities are "outstanding," a 2 if they are "very strong," a 3 if they are "generally positive," a 4 if they are "bland or somewhat negative or immature," a 5 for "questionable personal qualities," and a 6 for "worrisome personal qualities."

After applications have been read and assigned ratings for each category, a subset of the applicants are passed on to an additional reader, called the "third reader."[15] Provisional admissions decisions are then made at a subcommittee level called a "docket." In March, final decisions are made at the full committee level with all admissions officers present.[16]

3 Descriptive Analysis

We now turn to the characteristics of typical (that is, non-ALDC) Asian American and white applicants.[17] We begin by looking at their family backgrounds, showing that, on average, Asian American applicants come from poorer families than white applicants. Despite this, Asian Americans substantially outperform their white counterparts on academics. We then examine how Asian Americans and whites are rated by Harvard admissions officers and how these ratings are correlated with academic preparation.

3.1 Demographics

The first panel of Table 1 presents demographic characteristics for typical white and Asian American applicants as well as by whether or not they were admitted. The overall admit rate of white applicants over this period is 4.89% which is slightly lower than the 5.13% admit rate for Asian American applicants.

Asian American applicants are 4.49 percentage points more likely to be labeled disadvantaged by Harvard readers off a base of 6.36 percent.[18] Those who are labeled disadvantaged

[15] Second readers are present when the admissions officer is new or if the case is especially difficult.

[16] For four of the six application cycles in our sample (2016–2019), Harvard offered an Early Action program to its applicants. Full-committee admissions decisions for Early Action applicants were made before the end of December. Possible admissions outcomes include admission, rejection, or deferral to the regular application pool. Harvard states that Early Action applications are reviewed in exactly the same manner as non-early-action applications; see `https://college.harvard.edu/admissions/apply/first-year-applicants`.

[17] See Arcidiacono, Kinsler, and Ransom (2022) for characteristics of ALDC applicants.

[18] Trial Exhibit P001 instructs the Harvard reader to code the applicant as disadvantaged if "the applicant is from a very modest economic background."

are significantly more likely to be admitted, and this alone removes the difference in admission rates between white and Asian American applicants: for those who are disadvantaged, the admit rate for whites (Asian Americans) is 11.22% (10.33%); for those who are not, the admit rate for whites (Asian Americans) is 4.46% (4.49%). Asian Americans are also more likely to be first-generation college students and to have applied for a fee waiver. Both of these variables are also positively correlated with admission, though not as strongly as the disadvantaged status variable.

It may be surprising that Asian American applicants are disadvantaged relative to white applicants given that Asian Americans in the US have higher household incomes (US Census Bureau, 2020).[19] There are at least two explanations. The first is that children of low income Asian American families perform much better in the classroom than other racial groups.[20] This stronger performance in turn results in being more likely to apply to Harvard. Second, well-off Asian Americans may be more aware of the perception of discrimination against Asian Americans in admissions and hence may be less likely to report their race. This would be consistent with college admissions consultants often advising Asian American students to appear less Asian (English, 2015).

3.2 Academics

The second panel of Table 1 shows measures of the academic preparation of white and Asian American applicants. The evidence indicates that Asian American applicants are significantly stronger than their white counterparts. Using white applicants as a base, Asian Americans on average score 0.3 standard deviations better on both the SAT1 math and SAT2 subject tests, around 0.05 standard deviations better on high school grades, and take over 1.5 more AP exams with an average score that is 0.09 points higher.[21] While the average white applicant scores at the 53rd percentile of the academic index distribution, the average Asian

[19] Indeed, there are more disadvantaged Asian American applicants and admits than disadvantaged white applicants and admits despite whites making up a much larger share of the applicant pool.

[20] The recent controversy over admissions to Stuyvesant HS in New York City is a case in point (Wong, 2019). Admission to Stuyvesant and other elite high schools is based on a standardized test score. Stuyvesant's 2019 admitted class was over 65% Asian American and over 21% white, but less than 5% Hispanic or African American. Mayor Bill de Blasio proposed a minimum admissions quota for low-income students, but that was met with immediate legal opposition.

[21] AP exam scores are only available in a subset of the admission cycles.

American applicant is at the 63rd percentile. The academic index is a weighted average of the applicant's scores on the SAT1, SAT2, and high school grade point average (or class rank). It is used by Ivy League institutions to ensure recruited athletes meet minimum academic standards.[22] The only measure of academic preparation on which whites perform comparably is the SAT1 verbal.[23]

The differences in academic achievement between white and Asian American applicants becomes even more staggering when looking at deciles of the academic index. The first set of columns in Table 2 show the number of applicants in each decile for whites and Asian Americans. Overall, there are 42.5% more white applicants than Asian American applicants.[24] If white and Asian American applicants had similar distributions of academic preparation, then there should be approximately 42.5% more white applicants in each academic index decile. Yet, this is not what we observe. In the top (tenth) decile, there are 7,225 Asian American applicants and 4,963 white applicants, or *45.6% more* Asian American applicants than white applicants.[25] By contrast, in the bottom three deciles there are 53.4% more white applicants than Asian American applicants.

The differences in representation across academic index deciles are highly relevant because the academic index is correlated with admission. No white or Asian American typical applicants were admitted from the bottom decile in any of the six admissions cycles, and less than 10% of white and Asian American admits come from the bottom five deciles. In contrast, 73% of white and Asian American admits come from the top three deciles. Additionally, the admit rate increases monotonically with academic index decile for both whites and Asian Americans.

But as shown in Table 2, admission rates conditional on academic index decile are quite different between white and Asian American applicants. From the fourth decile to the

[22]See Document 415-8 footnote 29 for a more detailed discussion of the academic index.

[23]There may be a concern that Asian American applicants have SAT scores that are inflated due to retaking. Indeed, Table 2 of Goodman, Gurantz, and Smith (2020) shows that Asian Americans in the population are 10–14 percentage points more likely to retake the SAT than other racial groups, holding fixed varying factors. But it is not clear whether this is true for Harvard, especially in light of Asian Americans who report their race being disadvantaged relative to their white counterparts. Further, there is no evidence of Harvard using this argument in defense of their admission practices.

[24]Summing the first two columns of Table 2 indicates that there are 57,451 whites and 40,308 Asian Americans.

[25]In the top three deciles, there are 11% more Asian American applicants than white applicants.

tenth, white applicants are over 20% more likely to be admitted than their Asian American counterparts in the same decile. To illustrate, whites in the top (tenth) decile have an admit rate of 15.3% compared to an Asian American admit rate of 12.7%. And from the fifth decile to the ninth, Asian Americans are admitted at a rate similar to whites one decile lower.[26]

3.3 Harvard Ratings

It is of course the case that Harvard values much more than academics. Indeed, if the academic index were used to decide admissions for white and Asian American applicants (holding the admissions decisions of everyone else fixed), the number of Asian Americans admitted would increase by 828, a 40% increase.[27] So in order to rationalize the similarity in the overall admission rate between white and Asian American applicants, it must be the case that Asian Americans are substantially worse on other characteristics Harvard values, or they are being discriminated against, or some combination thereof.

We now examine how well Asian American and white applicants score on Harvard's ratings. We focus on how the share of applicants who receive a 2 or a 1 on each of the ratings differs by race, referring to a 2 or a 1 as a high score. A 2 is a natural cutoff since, for almost every rating and racial group, the median admit receives a 2 while the median reject receives a 3.[28]

For each of the ratings, Table 3 shows the share of typical Asian American and white applicants who receive a high score.[29] Given the previous discussion, it is not surprising that Asian Americans score substantially better on the academic rating: 60.2% of Asian Americans receive a high score, compared to 45.3% of white applicants.

But Asian Americans also score well on many of the other ratings. Asian Americans

[26] Similar racial gaps in admit rates conditional on academic index decile are observed at Yale (Document 1), suggesting that Harvard's behavior towards Asian Americans is not unique among elite institutions.

[27] This number is obtained by fixing the total number of white and Asian American typical admits at their current level, 4884, and then randomly sampling from the tenth decile to fill the class. If we further added in the other racial groups, the number of Asian Americans would more than double, with Asian Americans making up more than 50% of admits.

[28] See Trial Exhibit P621. The exceptions are as follows: athletic rating (median admit and median reject both receive a 3); the alumni personal rating for all groups and the academic rating for Asian Americans (median admit and median reject both receive a 2); and the overall and academic ratings for African Americans (median admit receives a 2 but median reject receives a 4).

[29] We treat those who are missing a rating as not having received a high rating.

are more likely to have high scores on the extracurricular rating and alumni overall rating and slightly more likely on both teacher ratings, the alumni personal rating, and the overall rating. They are slightly less likely to have high scores on the counselor rating, but the difference is less than 0.2 percentage points.

There are, however, two ratings where Asian Americans score significantly worse: the athletic rating and the personal rating.[30] Receiving an athletic rating of 2 does boost one's chances of admission. However, the share of typical applicants who receive a high score on the athletic rating is smaller than the corresponding share for any other rating. Additionally, a 4 on the personal or academic ratings virtually guarantees rejection for typical applicants. But there is no difference in the admit rate between those who get a 3 on the athletic rating versus those who get a 4. For typical applicants, then, the athletic rating appears to be less important than the other profile ratings in determining admissions outcomes.[31] Turning to the personal rating, not only do Asian Americans score worse than whites, they score worse than African Americans, Hispanics, and those not in one of the four major race/ethnic groups.[32] And the personal rating is strongly correlated with admission: 84% of white admits scored a 2 or better on the personal rating, compared to 18% of white rejects.[33]

The clear discrepancy between the personal rating and all other ratings is further shown by Harvard's OIR in Online Appendix Figure F2 for the Classes of 2007–2016. Of the characteristics that OIR analyzed, the personal rating is a clear outlier: Asian Americans are as strong or significantly stronger than whites on every rating except for the personal rating. Yet on the personal rating, they score more than 0.1 standard deviations lower—a fact that OIR could not statistically explain. The athletic rating is not included in this chart because legacies and athletes are excluded from their analysis and the primary purpose of the athletic rating is to distinguish recruited athletes.

[30] When the Office of Civil Rights investigated Harvard, it was these two ratings that were found to be the most subjective. See Trial Exhibit P555.

[31] Arcidiacono, Kinsler, and Ransom (2022) show that, among non-recruited athletes, white LDC applicants score the best on the athletic rating. The high scores may be in part due to the sports Harvard offers, such as sailing.

[32] See the "Average" row in Table 5.6R of Document 415-9.

[33] See Table 4.1R of Document 415-9.

3.4 Academics and Harvard Ratings

Given that Asian Americans are so much stronger on academics, could it be that excelling at academics comes at the cost of being appealing to Harvard on the personal front? This turns out to not be the case. In fact, the academic index is positively correlated with each of Harvard's ratings with the exception of the athletic rating.[34] Online Appendix Tables F2 through F4 show the share of applicants receiving a 2 or better for each of the ratings by academic index decile and race. For ratings like the academic rating, virtually no one receives a 2 if they are in the bottom decile, and virtually everyone receives a 2 if they are in the top decile, regardless of their race. But for every rating and for every racial group, higher academic index deciles are associated with higher probabilities of receiving a 2 or better.

Figure 1 illustrates this pattern graphically for the academic, extracurricular, personal, and overall ratings. The share receiving a 2 or better increases significantly from the 1st to the 10th decile of the academic index for each rating and each racial group. For the academic and extracurricular ratings, the racial gaps in the share receiving a 2 or better within each academic index decile are fairly small. In contrast, the personal and overall ratings indicate large and consistent racial gaps in the likelihood of receiving a 2 or better within each academic index decile. Moreover, the ordering of the racial categories within an academic index decile is identical between the overall and personal rating, with African Americans receiving the highest share followed by Hispanics, whites, and Asian Americans, respectively. Note that when readers assign an overall rating, they are allowed to incorporate any factors deemed valuable to Harvard, including race.[35] Thus, the patterns observed for the overall rating are likely a reflection of racial preferences. Because the pattern for the personal rating mirrors that of the overall rating, this is suggestive evidence that racial preferences play a role in the personal rating as well.

Further evidence that racial preferences impact the personal rating is presented in Table 4. This table focuses on applicants in the top academic index decile and compares the probability of receiving a two or higher on each of Harvard's ratings for Asian Americans

[34] There is no information in the public record about how the athletic rating is correlated with other factors for non-recruited athletes.

[35] See Document 421-9, pp. 259, 288 and 422.

relative to the three other major racial/ethnic groups.[36] The first column of Table 4 shows the share of Asian Americans in the top academic index decile who receive a high score on each of the ratings. The second column shows how much higher (or lower) the similar share was for white students in the top decile, with the third column showing the corresponding percentage increase (or decrease) relative to Asian Americans. The results are sorted by the difference between the white and Asian American share. In the top decile, the share of whites receiving a high score on the personal rating was over seven percentage points higher than Asian Americans, a 33% increase. While whites in the tenth decile scored higher on other ratings as well, the gaps are substantially smaller.

The fourth column shows the lowest decile in the academic index distribution where whites would still have a higher probability of receiving a high score. For the personal rating, whites in the 6th academic index decile have a higher probability of receiving a high score than Asian Americans in the top academic index decile. For all of the other ratings, Asian American applicants in the top decile have a higher probability of receiving a high score or better than whites below the 9th decile.

While the Asian American and white comparisons illustrate that the personal rating stands out relative to the other ratings, the especially striking comparisons are with African American applicants. African American applicants in the top academic index decile are over twice as likely to receive a high score on the personal rating as their Asian American counterparts (47% for African Americans versus 22% for Asian Americans).

It is important to note that higher academic index deciles are associated with higher personal ratings for all racial groups. African American applicants in the top (10th) decile are also twice as likely to receive a high score as African American applicants in the third decile.[37] Yet, even African Americans in the *third* academic index decile are more likely to receive a high score on the personal rating than Asian Americans in the *tenth* decile.

The patterns in the personal rating mirror what we see in places where Harvard acknowledges race places a role: in the overall rating and in the admit rates themselves. The bottom panel of Table 4 shows the overall rating and admit rate for those in the top academic index

[36] Over 44% of Asian American admits are in the top academic index decile.
[37] See Online Appendix Table F3.

decile. Like the personal rating, Asian Americans are rated the lowest and this is especially so when compared to African Americans and Hispanics.

The descriptive analysis strongly suggests that race plays a role in the personal rating in addition to the overall rating and admissions. It may affect the other ratings as well, but the personal rating is where the patterns are most stark. Based in part on these findings, our preferred admissions model discussed in the next section excludes the personal rating since its inclusion will tend to understate the role of race of admissions, though we return to this issue in Section 5.1.

4 A Model of Harvard Admissions

The descriptive evidence related to admissions suggests that there is scope for an Asian American penalty in the Harvard admissions process. We now turn to estimating a model of Harvard's admissions decisions, focusing in particular on measuring how being Asian American influences one's admissions outcome. In the sections below, we present our preferred admissions model and discuss the estimated Asian American penalty.

4.1 Admissions Model

The admissions data made available as part of the SFFA lawsuit cover six admissions cycles and include hundreds of variables describing each applicant.[38] It is not feasible to include every variable in every year since there would be as many regressors as admits. In the paragraphs that follow, we briefly discuss some of the key modeling choices that allow us to capture admissions decisions and the role of race in a simple, yet accurate manner.

The first key modeling decision is to pool the admissions data across years and estimate a logit model with indicators for admissions cycle.[39] The advantage of pooling the data is greater statistical power for uncovering some of the intricate patterns in admissions choices that are time-invariant. The drawback of the pooled model is that the relative importance

[38] A similar discussion of our modeling approach is presented in Section 4 and Appendix C of Arcidiacono, Kinsler, and Ransom (2022).

[39] The indicators for admissions cycle insure that in each year the average probability of admission matches that of the data.

of various applicant attributes may change over time. For example, if Harvard seeks to balance intended majors within each admissions cycle, then intended humanities majors are more valuable in years when they are relatively few. The pooled model can accommodate this variation through interactions between intended major and year. The question is which applicant characteristics are likely to have time-varying impacts. Fortunately, during the weeks and months that Harvard is making final admissions decisions, the admissions office publishes statistics about the makeup of the current admitted class, as well as how these numbers compare to previous classes. Admissions officers can use these "one-pagers" to generate similarly constituted admit classes over time, even if the applicant pool is changing. We use these "one-pagers" as guidance and include in our pooled regression interactions of admissions cycle with applicant characteristics included in the "one-pagers" such as gender, docket, intended major, and disadvantaged status.[40]

In addition to indicators for applicant race and the above interactions, we incorporate a broad set of controls, including numerous measures of socioeconomic status, neighborhood and high school attributes, and academic aptitude, among others. We also control for many of Harvard's internal ratings, including the academic, extracurricular, athletic, the school support measures, and the alumni interviewer ratings. For each rating, we create separate indicator variables for rating levels from 1 to 5. We do not include either the overall rating or the personal rating. The overall rating is specifically designed to incorporate admissions preferences, including racial preferences, and is therefore an inappropriate control. Similarly, the personal rating is excluded since, as we showed in the previous section, it also appears to be influenced by racial preferences. In Section 5.1, we discuss additional evidence that the personal rating is influenced by race, but also show how the estimated Asian American admissions penalty is impacted by its inclusion in the model.

To allow for the possibility that racial preferences operate differently according to applicant disadvantaged status and gender, we interact each of these indicator variables with race. One motivation for this choice is that Harvard's OIR includes race and low income interactions when studying admissions outcomes (Trial Exhibit P028).[41] OIR found that racial

[40]Section E.2.2 in the online appendix illustrates that similar models estimated year-by-year result in an estimated Asian American penalty nearly identical to what we find using our pooled specification.

[41]Family income is not in the data. It is unclear whether the low income variable used in the Harvard

preferences vary significantly with whether the applicant is low income for Asian American and African American applicants to the Classes of 2007–2016. Additionally, African American applicants are disproportionately female (60%), so if Harvard is interested in gender balance within race, African American men may see larger preferences than African American women. This is in contrast to the applicant pool as a whole, which is less than 50% female.[42] We also interact race with indicators for early application status and missing SAT II average. The latter allows for differences in the distribution of missing scores by race since the observed test score distributions differ by race.

Our preferred model includes 128,422 applicants across the six admission cycles. This sample is smaller than the sample of typical applicants discussed previously for three reasons. First, neighborhood and high school characteristics are only available for domestic applicants applying from within the US. Second, there is a small number of applicants who lack both teacher ratings. Finally, applicants whose characteristics perfectly predict rejection are excluded. The full set of controls for our preferred model is listed in Online Appendix B.[43]

4.2 Estimates of the Asian American Admissions Penalty

A subset of the estimated parameters for models with different sets of controls is displayed in Table 5. Column 1 controls for race and a handful of other demographic characteristics, yielding a coefficient on Asian American that is positive, small, and insignificant. This is consistent with the raw admit rates being similar for Asian American and white applicants. However, when academic characteristics are added, the Asian American coefficient becomes large and negative. This is consistent with Asian American applicants being much stronger in academics and Harvard putting significant weight on academics in the admissions decision.

internal report is actually the disadvantaged variable or whether that data was ported over. See also Arcidiacono (2005) who finds that racial preferences for African Americans in admissions and financial aid vary with whether the applicant is low income.

[42] See Document 415-9, Table B.3.2R.

[43] Our preferred admissions model includes approximately 350 applicant characteristics. One might be concerned that the estimated penalty against Asian American applicants results in part from the model being overfit. However, Table 5 shows that a series of intermediate models with fewer controls indicate a negative and statistically significant penalty again Asian American applicants. The only intermediate admissions model that does not show an Asian American penalty is an overly sparse model that only controls for demographics and geography—meaning no academic or Harvard ratings variables are included.

Adding further controls maintains the significantly negative coefficient on Asian American.

Column 5 shows estimates of our preferred model.[44] The coefficient on the Asian American indicator is negative and statistically significant (-0.466). Because the model contains interactions between race and gender and race and disadvantaged status, the results imply that—all else equal—male, non-disadvantaged Asian American applicants are penalized relative to similarly situated white applicants.[45] Although we do not display the coefficients in the table, the estimated Asian American penalty does not vary significantly with disadvantaged status, but it does vary by gender. The estimated coefficient on the interaction between Asian American and female is positive and significant (0.229), indicating that the Asian American penalty is smaller for female applicants.

The other coefficients in the estimated admissions model are consistent with Harvard's reader guidelines for evaluating applicants as well as its stated preferences for underrepresented minority groups and disadvantaged students. Applicants who receive a two or better on the academic or extracurricular rating are significantly more likely to be accepted.[46] Applicants who receive a four on either of these criteria see their chances of admission diminished relative to receiving a three.[47] The coefficients associated with being African American, Hispanic, or disadvantaged are all large, positive, and statistically significant.[48] Finally, conditional on all other observed attributes, early action applicants are more likely to be admitted than their regular admissions counterparts.

While the parameter estimates from our preferred specification indicate the existence of an Asian American penalty, it is difficult to understand the magnitude of the penalty from the coefficients alone. To put the magnitude of the Asian American penalty in context, we pursue two strategies. First, using the estimated coefficients, we show how the probability

[44]Column 6 illustrates how the coefficients change when we add the personal rating. This is discussed further in the next section.

[45]The model also includes an interaction between race and early applicant status, but these coefficients are close to zero and statistically insignificant.

[46]Though not shown, a similar pattern holds for the athletic and personal ratings.

[47]Obtaining a rating of 5 on the extracurricular rating is an indication of substantial activity outside conventional extracurricular participation such as family commitments or term-time work. See the 2018 reader guidelines (Trial Exhibit P001).

[48]The interactions of African American and Hispanic with disadvantaged status are negative and statistically significant but the overall racial preferences for disadvantaged African Americans and Hispanics are still large.

of admission would change for Asian American applicants if they had been treated as white applicants. Consider, for example, a male, non-disadvantaged Asian American applicant with a baseline probability of admission of p. The index of observables, Z, for this applicant according to the log odds formula is given by

$$Z = \ln\left(\frac{p}{1-p}\right) \tag{1}$$

which is the inverse of the standard logit formula. If this applicant were instead white, we would simply subtract the Asian American coefficient (-0.466) from the index so that the new admissions index would be $Z-(-0.466)$. The new admissions probability would then be given by $\frac{\exp(Z+0.466)}{1+\exp(Z+0.466)}$. A similar calculation can be made for various combinations of gender and disadvantaged status. The additional complication is that coefficients related to the interactions between Asian American and gender and Asian American and disadvantaged also need to be differenced out when applicable.

Table 6 lists the the results of these transformation exercises. The first entry in the table indicates that a non-disadvantaged, male, Asian American applicant with a baseline probability of admission of 1.0% would be admitted at a rate of 1.58% if treated as a similarly situated white applicant. This change reflects a 58% increase in the likelihood of admission. For other combinations of gender and disadvantaged status, the Asian American penalty is smaller.[49] As the baseline probability of admission increases, the percentage point increases are larger, but the percent increases are smaller: when the baseline admit rate is 25%, a non-disadvantaged, male, Asian American applicant would be admitted at a rate of 34.69% if treated as a similarly situated white applicant (a 39% increase).

The transformation exercises indicate that there is significant heterogeneity in the Asian American penalty according to gender, disadvantaged status, and the broader strength of the applicant. The average penalty faced by Asian American applicants will depend on the distribution of these characteristics in the applicant pool. Overall, the average marginal effect associated with Asian American is -1.02 percentage points, or a penalty of 19% off the

[49]For example, a disadvantaged, female, Asian American applicant with a baseline probability of admission equal to 1.0% would be admitted at a rate of 1.1% if treated as a similarly situated white applicant.

base admit rate of 5.19%.[50]

In Table 7 we report the average marginal effect of being an Asian American applicant by admissions index decile. The admissions index deciles are created by ranking Asian American applicants according to their observable indexes; that is, taking the controls and multiplying by the coefficients of the preferred model. Because of how competitive Harvard is and how well the model fits the data, the average marginal effects are highly skewed. Those in the bottom 50% according to the admissions index have essentially no chance of being admitted, a reflection of how well the model fits the data. Hence the marginal effect for the bottom 50% of Asian American applicants is quite small at -0.02 percentage points, still a substantial penalty given their base admit rate of 0.04%. The average marginal effect rises with each decile with those in the top decile seeing an average marginal effect of 6.19 percentage points, or a penalty of 14%.

5 Robustness of the Asian American Penalty

Asian American applicants to Harvard face a substantial admissions penalty relative to similarly situated white applicants. In this section, we demonstrate that our finding is robust to the inclusion of the personal rating and ALDC applicants. We also investigate the likelihood that our estimates could be driven by omitted variable bias.

5.1 Personal Rating

A key set of controls in the estimated admissions model are the internal Harvard ratings of applicants. However, we exclude two ratings from our preferred model, the overall and personal ratings. Harvard readers are explicitly allowed to incorporate an applicant's race in the overall rating, and, as a result, it is an improper control if the purpose of the model is to estimate racial preferences. In Section 3, we present descriptive evidence that the personal rating is also significantly influenced by applicant race.

[50]See Table 8.2 of Document 415-9. Note that applicants who the model can predict perfectly are not included in the calculation. When these applicants are included, the average marginal effect falls slightly to -0.99%. We prefer the results excluding perfect predictions as race is only relevant for applicants who have a chance of admission. Either way of calculating the marginal effect results in a statistically significant effect at the 5% level.

In Online Appendix C we provide additional evidence that the personal rating is influenced by race, and is thus an improper control in an admissions model aimed at estimating racial preferences. We estimate a series of ordered logit regressions where the outcome is a rating of interest, say the extracurricular or personal rating. Our preferred ratings models are very similar to our preferred admissions models in the types of applicant characteristics included. Importantly, in each of the ratings models, we condition on all of the other Harvard ratings, excluding the personal and overall ratings.[51] While applicant race plays a statistically significant role in a handful of Harvard's ratings, race is most prominent in the personal and overall ratings. Further, in these two ratings, adding controls moves the race coefficients away from zero; the models for the other ratings generally show the coefficients moving towards zero as more controls are added. See Online Appendix Figure F1.

After controlling for hundreds of applicant characteristics, including Harvard's other ratings and measures of socioeconomic status, Asian Americans receive significantly lower personal and overall ratings. This occurs despite Asian Americans being stronger on the observables associated with these ratings; and indeed stronger on the observables associated with every modeled rating.[52] In contrast, African American and Hispanic applicants receive significantly higher personal and overall ratings. For a sense of the magnitudes, Asian Americans would see 20% higher odds of receiving a 2 or better on the personal rating if they were treated as white applicants. These odds would almost double if they were treated as African American applicants. Moreover, Asian American (African American) applicants are stronger (weaker) on the observed characteristics associated with high personal and overall ratings, making it unlikely that they are significantly weaker (stronger) on the unobserved factors impacting the personal rating.[53]

[51] We also estimate models without these ratings with similar qualitative findings. Note that, were Asian Americans to be penalized in other ratings besides the overall and personal ratings, controlling for these ratings would result in any Asian American penalties in the ratings to appear smaller than they actually are.

[52] See Table B.6.11R in Document 415-9. The athletic rating was not modeled.

[53] In further support of this point, admissions data from the University of North Carolina-Chapel Hill (UNC) contradicts Harvard's claim that Asian American applicants have worse personal qualities (see Tables A.5.1 and A.5.2 of Document 160-1). Estimating a similar personal rating model using either in-state or out-of-state applicants to UNC reveals no differences in personal ratings for Asian American and white applicants. Note that the out-of-state admissions process to UNC is highly competitive, with an admit rate of only 13.5% (see Table 2.1 of Document 160-1)

There are additional patterns in the assignment of the personal rating that suggest it is partly a tool to implement Harvard's preferences over the racial composition of its admits. For example, in the personal rating model the interactions between African American and female and African American and disadvantaged are significantly negative, implying racial preferences are muted for these two groups. The share of applicants who are female or disadvantaged is significantly higher for African Americans than for any of the other three major racial/ethnic groups, so if Harvard is interested in balancing within-race characteristics then we would expect to see muted preferences for African American applicants who were female or disadvantaged.[54] The only other rating that exhibits these patterns is the overall rating, a rating that we know Harvard uses to directly implement racial preferences.[55]

Despite the preponderance of evidence indicating that the personal rating incorporates racial preferences, we also estimate the Asian American penalty in admissions when the personal rating is included. These results are shown in the last column of Table 5. We do this for two reasons. First, it allows us to determine how much of the Asian American penalty operates through the personal rating. Second, it provides a plausible lower bound for the true Asian American penalty. Adding the personal rating to our admissions model leaves a statistically significant penalty of -0.54 percentage points which, given the admit rate for Asian American applicants as a group, implies that Asian Americans would be 10% more likely to be admitted if treated as similarly situated whites but keeping the bias in the personal rating.[56] So even if one were to assume—erroneously, according to our analysis—that the personal rating was not biased, a substantial Asian American penalty remains. A more reasonable interpretation is that the reduction in the Asian American penalty implies that the personal rating accounts for a little less than half of the total Asian American penalty.

[54]Table 3.1R of Document 415-9 shows descriptive statistics by racial/ethnic group, including share female and share disadvantaged.

[55]Online Appendix Section E.1 provides an extended discussion of the evidence showing that the personal rating incorporates racial preferences.

[56]The Asian American penalty persists even when we include the overall rating as a control in a model with a slightly different sample and slightly different set of controls. See Table B.7.1 of Document 415-8. This estimate is not expressed as a marginal effect, so it is difficult to compare with other estimates. However, the Asian American coefficient is negative and significant.

5.2 ALDC Applicants

Our preferred admissions model excludes ALDC applicants (recruited athletes, legacies, donor connections, children of faculty/staff) since there is ample evidence that the process works differently for them. Although Harvard claims the admissions process is the same for ALDC applicants, this is not the case. Athletes have a direct connection with an on-campus advocate (coaches), donor-connected applicants are literally on a special "dean's interest" list, and the dean of admissions directly reviews the files of legacies and children of faculty/staff.[57] Typical applicants receive none of these advantages. Thus, there is strong a priori evidence indicating that the process works differently for ALDC applicants.

In addition, the data reveal that other applicant characteristics influence admissions differently for ALDC applicants. In particular, the importance of academics and extracurricular activities is watered down. This is illustrated in Table 6 of Arcidiacono, Kinsler, and Ransom (2022), where the coefficients on Harvard's academic and extracurricular ratings fall (especially at low ratings) when ALDCs are included in the admissions model. The differential treatment of these applicants can also be seen in Online Appendix Table F5. White legacy, donor-connected, and faculty/staff applicants (LDC) in the bottom 10% of the academic index distribution had a higher admit rate than the average white applicant. Further, in the bottom 10% of the academic index distribution, virtually all typical applicants are rejected. There were two African American typical admits in the bottom decile across the six admission cycles and no admits from any other racial group. This means that the admit rate for African American typical applicants in the bottom decile of the academic index is 0.03% as compared to an over 6% admit rate for white LDC applicants in the bottom decile.

In light of this evidence, there are two reasonable approaches for handling ALDC applicants. First, ALDC applicants can be added to the admissions model, but it is imperative to interact their special applicant status with many other applicant characteristics to allow for

[57] See Document 419-1, p. 41 and footnote 89 of Document 419-143 for documentation on the admissions process for athletes. Document 421-9 describes how donor-connected applicants are handled differently by the admissions office. For legacy applicants, the application reading procedures instruct that these files "should be read by [Admissions Dean Fitzsimmons] following the normal reading process if the decision might require special handling or if another reading might be helpful" (Trial Exhibit P001, p. 3). For children of faculty/staff, the reading procedures state that "All [faculty] and [staff] folders should be sent to [Dean Fitzsimmons] after the normal reading process has been completed." (Trial Exhibit P001, p. 3).

differential treatment. The second approach is to simply exclude ALDC applicants, and as we show in Online Appendix A, obtain consistent estimates of the Asian American penalty for typical applicants. We follow the second approach, where the only potential drawback is that we do not estimate the role that race plays in admissions for ALDC applicants. Since more than 97% of Asian American applicants are not ALDC, this seems like a reasonable tradeoff.

While we believe our decision to exclude ALDC applicants is appropriate, we have also estimated admissions models that include these special applicants. To be clear, these models do not interact special applicant status with academic and extracurricular characteristics as we advocate above, and as a result are likely to understate the penalty experienced by typical Asian American applicants.[58] When LDC applicants are added to our preferred admissions model (and indicators for LDC status are included), we find that the probability of admission for a typical Asian American applicant increases from 5.2% to 6.1% when treated as a white applicant (see Table 7.2R of Document 415-9).[59] Without LDC applicants in the model, the same thought experiment yields an increase in admissions chances from 5.2% to 6.2%. While we have not estimated our preferred admissions model with recruited athletes, Tables B.7.1 and B.7.2 of Document 415-8 illustrate that in a slightly altered admissions model, the addition of ALDC applicants mildly reduces the negative impact of Asian American status for typical applicants.[60] This is similar to what we find when adding only LDC applicants to our preferred specification.

There are two important takeaways from the admissions models that include ALDC applicants. First, the estimated penalty for typical Asian American applicants remains large and statistically significant. Second, the estimates suggest that Asian American applicants who are ALDC are not penalized because of their race. These two results are not in conflict, as there is no ex-ante reason why discrimination should work the same across all groups of applicants. In fact, by belonging to one of the special applicant groups, Asian American

[58] Here we are limited to models that are already part of the public record since we no longer have access to Harvard admissions data.

[59] When LDC applicants are added, we introduce indicator variables for legacy, double legacy, faculty or staff child, donor connection, interactions between legacy and race, and interactions between faculty/staff child or donor connection and race.

[60] See Section 8 of Document 415-9 for a detailed discussion of how this model differs from our preferred model.

applicants may be able to overcome stereotypes that hold typical Asian American applicants back.

The lack of a penalty against Asian American ALDC applicants should not diminish claims that Harvard employs admissions practices that discriminate against Asian Americans. More than 97% of Asian American applicants are not ALDC, meaning that nearly all Asian American applicants face an explicit penalty in admissions. Moreover, the very existence of ALDC preferences works to the detriment of the overwhelming majority of Asian Americans. ALDC applicants are predominantly white, and as we show in Arcidiacono, Kinsler, and Ransom (2022), the elimination of either legacy or athlete preferences would increase the number of Asian American admits by more than 4%.

5.3 Scope for Omitted Variable Bias

Our estimate of the Asian American admissions penalty at Harvard is based on a logit model that includes more than 300 applicant characteristics. Included in these attributes are Harvard's internal ratings of applicants along a variety of dimensions, including extracurricular activities, recommendations from high school teachers and counselors, and alumni interviews. Relative to previously published analyses of US admissions decisions, the richness of the available data is without rival.[61] However, the possibility remains that the estimated admissions penalty for Asian American applicants is not causal and instead reflects the impact of unobserved attributes that are more common among Asian American applicants relative to white applicants. We present evidence in the following sections that suggests this is unlikely.

[61] Various papers have explored the impact of race (Long, 2004; Arcidiacono, 2005; Antonovics and Backes, 2014) and legacy status (Espenshade, Chung, and Walling, 2004; Espenshade and Chung, 2005; Hurwitz, 2011) on US admissions decisions. Admissions models in these papers typically have access to only a handful of applicant attributes and typically have to estimate their average impact across multiple colleges. Bhattacharya, Kanaya, and Stevens (2017) focus on the impact of academic credentials on admissions decisions using detailed data from a selective UK university. This paper is closest to ours in the richness of the available data.

5.3.1 Strength of Asian Americans on observables

While it is infeasible to directly test for omitted variable bias since the relevant attributes are by definition unobserved, we can examine the average strength of each racial group based on their "observed admissions index." If a group of applicants is strong on the observed attributes that predict admission, they are likely to be strong on unobserved attributes that predict admission. Using our estimated model, we construct an admissions index which assesses applicants' strengths based on how their observed characteristics translate into a probability of admission, after removing race and year effects. We then construct deciles of this admissions index, with higher deciles corresponding to stronger observed characteristics. The results for Asian American and white applicants are displayed in the first two columns of Table 8. Asian American applicants are stronger, with 13.1% of Asian American applicants in the top decile and only 10.5% of white applicants in the top decile; among the top two deciles, the Asian American share is 25.9%, while for whites it is 21.2%.[62]

The result that Asian American applicants are stronger on the observable characteristics associated with admissions is unsurprising given the incredible academic strength of this group.[63] However, Asian American applicants could be weaker along observed non-academic dimensions. If this were the case, it would suggest that they might be weaker on unobserved non-academic dimensions. It is not clear whether the unobservables are disproportionately non-academic.[64] But we can assess whether Asian American applicants are weaker on the non-academic attributes related to admission. We construct a non-academic index by removing those characteristics that are explicitly academic in nature (e.g., test scores, grades, academic ratings) from the admissions index. Results are shown in the third and fourth columns of Table 8. In each of the top 4 deciles there is a larger share of Asian American

[62] While the Asian American strength is clear using any decile comparisons, focusing on the top two deciles is relevant because this is where most admitted students come from. For example, the results in Table 7 imply that over 93% of Asian American admissions come from those in the top 20% of the observed admissions index.

[63] Table 5.3 of Document 415-8 shows that over 51% of the class would be Asian American if admissions were based entirely on the academic index.

[64] Despite the fact that our preferred model includes many academic measures, it is still likely that we fail to capture all dimensions of applicant academic success. For example, academic-related attributes, such as AP exams taken, AP scores, and academic awards such as winning the Harvard-MIT Mathematics Tournament (HMMT) are excluded from the model. We know that Asian Americans are stronger on AP exams, and are likely stronger on other unobserved academic measures.

applicants relative to white applicants. It is clear that, on non-academic measures, Asian American applicants are at least as strong as white applicants.

Included in the non-academic measures affecting admissions are certain attributes that are likely to favor Asian American applicants, such as disadvantaged and first-generation status. There are also non-academic attributes that likely harm the admissions chances of Asian American applicants, such as geography.[65] However, we can eliminate the impact of these attributes and construct a non-academic admissions index consisting only of Harvard's extracurricular, athletic, school support, and alumni ratings. The final two columns display the results when we construct the admissions index in this manner, and we still find that Asian American applicants are just as strong, if not stronger than white applicants.

5.3.2 Model Fit

Further limiting the scope for omitted variable bias is how well our preferred model fits the data. The Pseudo R^2—or McFadden's R^2—of our model is 0.56. While higher values of this measure indicate a better model fit, it does not have the same interpretation as the R^2 used in linear models except when either (i) the model explains the data completely (in which case they are both one) or (ii) the model only has an intercept term (in which case they are both zero). The classic citation on the relation between the two R^2's, McFadden (1979), suggests that 0.56 is well above what would be considered an excellent fit.[66] But the designation "excellent fit" is still not especially precise. To provide more evidence on the fit of the model, we first consider how our Pseudo R^2 translates into an R^2 of the latent index and then examine the accuracy of the admissions model.

We can link the two R^2 measures by returning to the underlying model of the admissions process. Namely, when an applicant's latent index, Y_i^*, exceeds some threshold τ, they are

[65] Document 415-9 section 9.3 shows that dockets (i.e. geographic areas) with a higher share of Asian Americans face a penalty. This can result from Harvard valuing geographic diversity in combination with Asian Americans being so competitive. A larger number of applicants are likely to come from areas that have higher shares of Asian Americans.

[66] McFadden (1979), p. 307, states that

> Those unfamiliar with the ρ^2 index should be forewarned that its values tend to be considerably lower than those of the R^2 index and should not be judged by the standards for a "good fit" in ordinary regression analysis. For example, values of 0.2 to 0.4 for ρ^2 represent an excellent fit.

The ρ^2 referred to here later became known as McFadden's R^2, or the Pseudo R^2.

admitted. Denote the observed part of this index as $AI_i = X_i\beta$, implying:

$$Y_i^* = AI_i + \epsilon_i. \tag{2}$$

Following McKelvey and Zavoina (1975) and expanded upon by Veall and Zimmermann (1996), we can calculate how much of the observables—as measured by AI_i—explain the (implicit) scoring of Harvard's applicants Y_i^*. To calculate the implied R^2 associated with (2), we simulate AI_i's and ϵ_i's that are consistent with (i) an overall admit rate of 5.45% and (ii) a Pseudo R^2 of 0.56. The simulation of the ϵ's entails draws from a logistic distribution as that is what was used to generate the model estimates.

What is unknown is the distribution of AI_i.[67] Assuming that the distribution of AI_i follows a normal distribution and matching the overall admit rate and the Pseudo R^2 of the model results in an implied R^2 of 0.8 for the latent index. However, the implied R^2 will be sensitive to the distribution chosen for AI_i. In Online Appendix D, we show that there is additional information in the public reports that is helpful in recovering the distribution of AI_i. Incorporating this additional information suggests that an implied R^2 of 0.8 is conservative, though also relies on assumptions about the the tails of the distribution of AI_i.

We use a similar approach to calculate the accuracy of the admissions model which, as we show in Online Appendix D, is less sensitive to the choice of the distribution of AI_i. Namely, given the distributions of AI_i and ϵ_i, we simulate admissions decisions and ask how well the model predicts admissions decisions based on AI_i alone. The accuracy for admits is then what share of the 5.45% of simulated admits based on AI_i and ϵ_i are in the top 5.45% of the AI_i distribution. The accuracy for admits is over 64%, remarkably high given that only 5.45% of applicants are admitted. We can similarly compute the accuracy of rejects, i.e. what share of the simulated rejects are in the bottom 94.55% of the AI_i distribution. Predicting rejection is much easier since so few applicants are admitted, and our corresponding accuracy of rejects is over 99%.

The exceptional fit of the model leaves only a limited amount of unobserved information. Given that Asian Americans are stronger overall on variables that account for a substantial

[67] This distribution could be calculated using the underlying data. However, the information needed to do so is not in the public record.

amount of Harvard's admissions decisions, it would be remarkable if they were significantly worse on the small portion of characteristics that are unobservable.

6 Conclusion

The perception that Asian Americans are discriminated against in elite college admissions has led college consultants to "make them less Asian when they apply" (English, 2015). Using data made public from the *SFFA v. Harvard* case, we show that this perception is justified for almost all Asian American applicants.[68]

The discrimination manifests itself both in a direct penalty in admissions, but also in an Asian American penalty in some of Harvard's ratings. Asian Americans are stronger than white applicants on the observables associated with each of the ratings with the exception of the athletic rating, which was not modeled. Yet, on ratings like the personal and overall rating, Asian Americans receive lower ratings.[69] For example, Asian Americans would see 20% higher odds of receiving a 2 or better on the personal rating if they were treated as white applicants. These odds would almost double if they were treated as African American applicants.

These penalties against Asian Americans in the ratings also translate to penalties in admissions. Using whites as a base, our preferred model shows an average marginal effect -1 percentage point for being Asian American. This implies a 19% penalty given the admission rate for typical Asian Americans was slightly over 5% for the period we analyze. This admissions penalty is likely an understatement for the following reasons: (*i*) Asian Americans are stronger than whites on the observables associated with admission; and (*ii*) there is evidence of bias against Asian Americans in some of the other ratings that are included in the model.

It remains an open question how the loss of these admissions opportunities impacts Asian Americans. Based on their strong applications, it seems likely that Asian American applicants denied admissions to Harvard as a result of race will attend an alternative selective

[68] The exception is the less than 3% of Asian American applicants who are ALDC.

[69] At the same time, underrepresented minorities receive a bump on these ratings despite being substantially worse on the observables associated with each of the ratings.

college. Of course, this does not necessarily mean that the costs are inconsequential as the monetary and non-monetary value of attending Harvard might be quite high. For example, the recent college admissions scandal suggests some families have intense preferences for attending an elite college (Chappell and Kennedy, 2019). More importantly, individuals will always have an opportunity to attend a different school, apply for a different job, or live in different neighborhood when racial bias shrinks the choice set. Yet, the availability of alternatives cannot justify discriminatory behavior.

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Figures and Tables

Table 1: Summary Statistics of White and Asian American Applicants and Admits

	White			Asian American		
	Reject	Admit	Total	Reject	Admit	Total
Panel A: Demographics						
Admitted	0.00	100.00	4.89	0.00	100.00	5.13
Female	45.75	43.14	45.62	49.12	52.65	49.30
Disadvantaged	5.94	14.61	6.36	10.26	21.86	10.85
First-generation college	4.29	4.05	4.28	7.98	9.65	8.07
Applied for fee waiver	8.00	12.15	8.20	12.88	18.39	13.16
Applied for financial aid	73.83	72.17	73.75	76.37	77.27	76.41
Mother's education: MA or higher	37.86	46.24	38.27	37.63	44.78	38.00
Father's education: MA or higher	46.36	52.38	46.65	54.89	59.60	55.13
Panel B: Academic Preparation						
SAT1 math (z-score)	0.12	0.56	0.15	0.41	0.77	0.43
	(0.82)	(0.50)	(0.81)	(0.73)	(0.37)	(0.72)
SAT1 verbal (z-score)	0.31	0.72	0.33	0.31	0.74	0.33
	(0.76)	(0.43)	(0.75)	(0.80)	(0.41)	(0.79)
SAT2 avg (z-score)	-0.01	0.58	0.03	0.32	0.81	0.35
	(0.86)	(0.50)	(0.85)	(0.82)	(0.38)	(0.81)
Standardized high school GPA (z-score)	0.17	0.50	0.18	0.21	0.52	0.22
	(0.86)	(0.52)	(0.85)	(0.82)	(0.47)	(0.81)
Academic index (z-score)	0.16	0.76	0.19	0.39	0.91	0.42
	(0.80)	(0.38)	(0.79)	(0.78)	(0.32)	(0.77)
Academic index percentile	0.52	0.75	0.53	(0.78)	0.83	0.63
	(0.26)	(0.19)	(0.26)	(0.27)	(0.16)	(0.27)
Number of AP tests taken	4.08	5.91	4.16	5.60	7.50	5.68
	(3.91)	(3.85)	(3.93)	(4.07)	(3.38)	(4.06)
Average score of AP tests	4.39	4.74	4.41	4.48	4.82	4.50
	(0.59)	(0.34)	(0.58)	(0.56)	(0.28)	(0.55)
N	54,768	2,814	57,582	38,343	2,072	40,415

Source: Table B.3.1R of Document 415-9.

Notes: Data restricted to typical (non-ALDC) applicants from the Classes of 2014–2019. Standard deviations in parentheses. AP scores are only available for a subset of the years.

Table 2: Shares and Admission Rates of Applicants by Academic Index Decile and Race

	Number of Applicants		Share of Applicants		Admit Rate	
Decile	White	Asian American	White	Asian American	White	Asian American
1	2,822	1,511	4.91	3.75	0.00	0.00
2	4,404	2,045	7.67	5.07	0.39	0.20
3	6,073	2,644	10.57	6.56	0.56	0.64
4	6,359	3,020	11.07	7.49	1.82	0.86
5	7,658	3,874	13.33	9.61	2.57	1.86
6	5,924	3,614	10.31	8.97	4.20	2.49
7	7,053	4,527	12.28	11.23	4.79	3.98
8	6,478	5,316	11.28	13.19	7.53	5.12
9	5,717	6,532	9.95	16.21	10.77	7.55
10	4,963	7,225	8.64	17.92	15.27	12.69

Source: Authors' calculations from data presented in Table 5.1R of Document 415-9.

Notes: Share columns sum to 100 within each group. Data restricted to typical (non-ALDC) applicants from the Classes of 2014–2019.

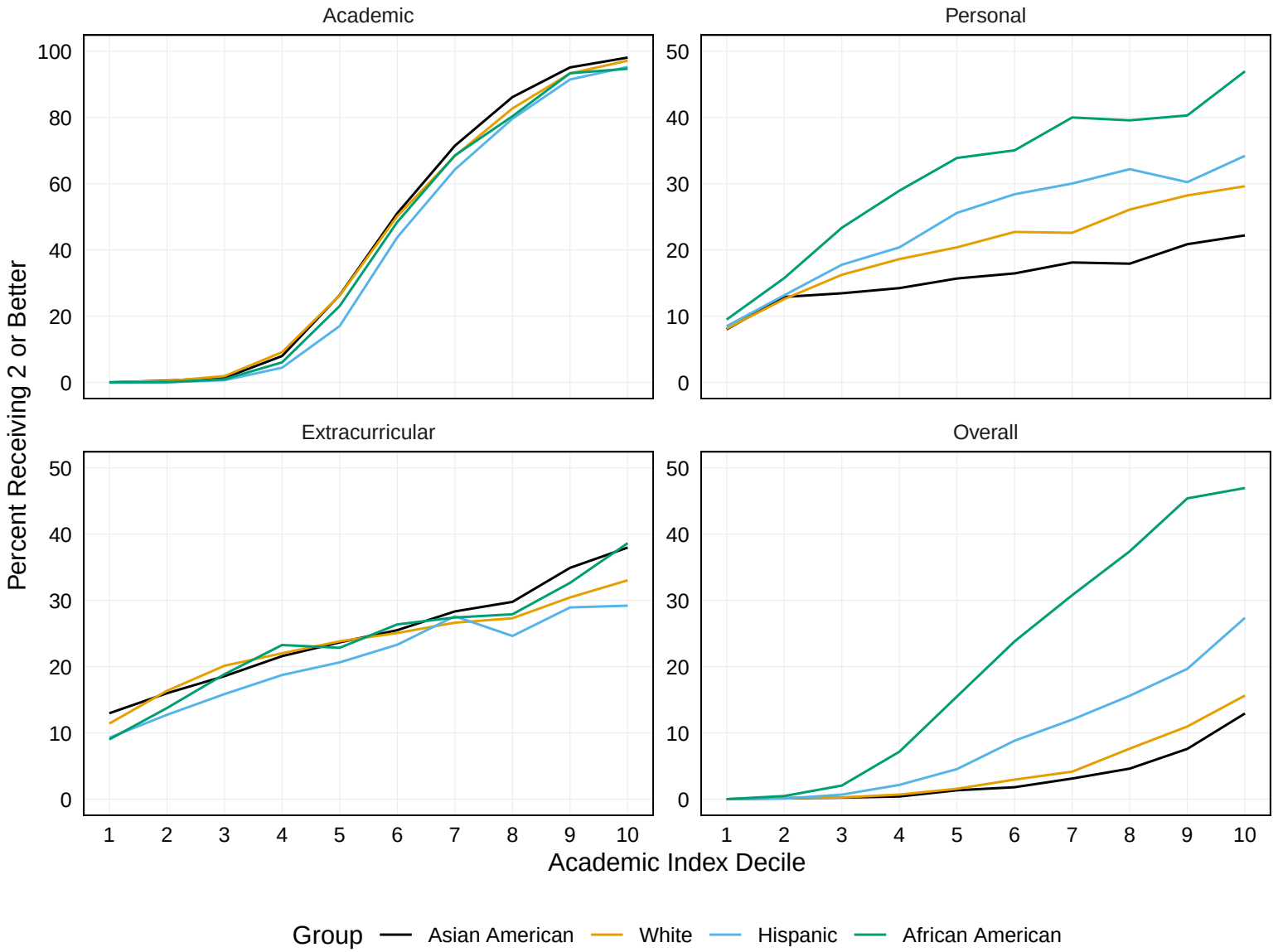
Table 3: Share of Applicants Receiving a 2 or Better on Application Ratings

Rating	White	Asian American
Overall	4.43	4.84
Academic	45.29	60.21
Extracurricular	24.35	28.23
Athletic	12.79	4.81
Personal	21.27	17.64
Teacher 1	30.42	30.79
Teacher 2	27.13	27.41
Counselor	25.28	25.12
Alumni Personal	49.92	50.33
Alumni Overall	36.49	40.89

Source: Authors' calculations from data presented in Trial Exhibit P621.

Notes: Those with missing ratings are coded as not having received a 2 or better. Data restricted to typical (non-ALDC) applicants from the Classes of 2014–2019.

Figure 1: Percent Receiving 2 or Better on Various Ratings by Race and Academic Index Decile



Source: Authors' calculations from Tables 5.4R, 5.6R and 5.7R of Document 415-9.

Table 4: Asian American Ratings and Admit Rate in Top Decile of Academic Index, Compared to Other Race Groups in Top Decile

		Comparison with Whites			Comparison with African Americans			Comparison with Hispanics		
Rating/Outcome	Asian American Rate in Top AI Decile	Difference in Top AI Decile	Pct Increase/ Decrease in Top AI Decile	Lowest Decile with Higher Rate	Difference in Top AI Decile	Pct Increase/ Decrease in Top AI Decile	Lowest Decile with Higher Rate	Difference in Top AI Decile	Pct Increase/ Decrease in Top AI Decile	Lowest Decile with Higher Rate
Personal	22.20	7.42	33.42	6	24.77	111.57	3	12.01	54.10	5
Counselor	38.34	6.29	16.41	9	10.90	28.44	9	6.66	17.37	10
Teacher 2	41.90	5.21	12.44	10	8.86	21.15	9	7.84	18.71	10
Teacher 1	46.64	3.53	7.56	10	8.66	18.57	9	2.83	6.07	10
Alumni Personal	63.61	1.37	2.15	10	9.87	15.52	7	7.44	11.70	10
Alumni Overall	63.10	0.03	0.04	10	3.57	5.65	10	1.37	2.18	10
Academic	98.08	-0.92	-0.94	-10	-3.38	-3.45	-10	-2.81	-2.87	-10
Extracurricular	37.98	-4.93	-12.99	-9	0.66	1.73	10	-8.77	-23.09	-8
Admit	12.69	2.58	20.34	10	43.37	341.70	4	18.62	146.74	6
Overall	12.93	2.71	20.95	10	34.04	263.34	5	14.44	111.71	8

Source: Authors' calculations from Tables 5.2R and 5.4–5.7R of Document 415-9.

Notes: All results are conditional on being in the highest academic index decile. Negative signs in front of deciles (in columns 4, 7 and 10) emphasize that Asian Americans perform better than the given group on that particular rating. Note that this is only ever true for the academic and extracurricular ratings.

Table 5: Selected Coefficients, Admissions Models

	(1)	(2)	(3)	(4)	(5)	(6)
African American	0.531	2.417	2.671	2.851	3.772	3.876
	(0.040)	(0.050)	(0.074)	(0.078)	(0.105)	(0.112)
Hispanic	0.425	1.273	1.286	1.339	1.959	2.027
	(0.039)	(0.044)	(0.063)	(0.067)	(0.085)	(0.091)
Asian American	0.057	-0.434	-0.565	-0.378	-0.466	-0.330
	(0.032)	(0.035)	(0.052)	(0.055)	(0.070)	(0.074)
Female	-0.044	0.254	0.228	0.271	0.163	0.141
	(0.025)	(0.027)	(0.064)	(0.088)	(0.110)	(0.116)
Disadvantaged	1.183	1.257	1.497	1.606	1.660	1.535
	(0.042)	(0.048)	(0.071)	(0.108)	(0.138)	(0.147)
Early Action	1.616	1.456	1.371	1.348	1.410	1.440
	(0.032)	(0.035)	(0.055)	(0.084)	(0.104)	(0.110)
Academic Rating=4					-3.990	-3.915
					(0.626)	(0.633)
Academic Rating=2					1.425	1.941
					(0.090)	(0.128)
Academic Rating=1					4.094	5.122
					(0.156)	(0.185)
Extracurricular Rating=4					-1.301	-1.122
					(0.393)	(0.408)
Extracurricular Rating=2					1.990	1.810
					(0.082)	(0.108)
Extracurricular Rating=1					4.232	4.215
					(0.169)	(0.187)
Athletic Rating=4					-0.182	-0.043
					(0.038)	(0.041)
Athletic Rating=2					1.368	1.354
					(0.114)	(0.155)
N	142,728	142,700	142,700	136,061	128,422	128,082
Pseudo R Sq.	0.078	0.260	0.262	0.283	0.556	0.604
Demographics	Y	Y	Y	Y	Y	Y
Academics	N	Y	Y	Y	Y	Y
Race and Gender Interactions	N	N	Y	Y	Y	Y
HS and NBHD Variables	N	N	N	Y	Y	Y
Ratings (excluding Personal)	N	N	N	N	Y	Y
Personal Rating	N	N	N	N	N	Y

Source: Data presented in Table B.7.1R of Document 415-9.

Notes: All models include year indicators and year interactions. Standard errors reported below each coefficient in parentheses. In models (3)-(6), the race coefficients reflect preferences for male, non-disadvantaged students. The excluded ratings categories are a 3. A full list of controls is available in Online Appendix B.

Table 6: Probability of Admission (%) for an Asian American if Treated Like a White Applicant

	Baseline Probability (%)			
Group	1.00	5.00	10.00	25.00
Asian, male, not disadvantaged	1.58	7.74	15.04	34.69
Asian, female, not disadvantaged	1.26	6.25	12.34	29.70
Asian, male, disadvantaged	1.37	6.77	13.29	31.51
Asian, female, disadvantaged	1.10	5.46	10.87	26.78

Source: Calculations based on coefficients listed in Table 5 and formula given in Equation (1).

Table 7: The Asian American Penalty at Different Admissions Deciles

Admissions Index Decile	Marginal Effect	Admission Prob. w/ Penalty	Admission Prob. no Penalty	Pct. Increase if Penalty Removed
5 and Below	-0.02%	0.04%	0.06%	40.24%
6	-0.13%	0.32%	0.44%	39.81%
7	-0.31%	0.77%	1.08%	39.98%
8	-0.78%	2.03%	2.82%	38.63%
9	-2.45%	7.01%	9.46%	34.98%
10	-6.19%	41.68%	47.87%	14.84%

Source: Table 9.1 of Document 415-9.

Notes: Admissions index decile refers to the ranking of Asian-American applicants by their estimated admission index (i.e. the controls times their coefficients), absent admissions cycle.

Table 8: Distribution of White and Asian American Applicants (%) by Strength on Observed Factors Affecting Admission

	Admissions Index		Non-Academic Admissions Index		Non-Academic Ratings Admissions Index	
Decile	Asian American	White	Asian American	White	Asian American	White
5 or lower	38.1	45.8	46.6	48.0	43.9	45.7
6	11.3	11.1	10.4	10.6	11.3	10.5
7	12.0	11.2	10.7	10.4	10.6	10.9
8	12.8	10.7	10.9	10.4	11.1	10.8
9	12.8	10.7	11.0	10.3	11.7	10.8
10	13.1	10.5	10.4	10.3	11.3	11.3

Source: Tables 7.3R, 7.4R, and 7.5R of Document 415-9.

Notes: Numbers indicate the percentage of applicants within each cell. Each column sums to 100.

Decile refers to the ranking of typical applicants on the given dimension of their estimated admissions index. The admissions index includes all covariates in the admissions model except race and the admissions cycle. The non-academic admissions index excludes test scores, grades and academic ratings from the admissions index. The non-academic ratings admissions index excludes all admissions model covariates except the following Harvard ratings: extracurricular, athletic, school support, and alumni ratings.