No. 20-1199

IN THE
Supreme Court of the United States

STUDENTS FOR FAIR ADMISSIONS, INC.,
Petitioner,

v.

PRESIDENT AND FELLOWS OF HARVARD COLLEGE,
Respondent.

On Writ of Certiorari to the United States Court of Appeals for the First Circuit

CORRECTED BRIEF OF PROFESSORS OF ECONOMICS AS *AMICI CURIAE* IN SUPPORT OF RESPONDENT

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INTEREST OF *AMICI CURIAE*[1]

Amici—George A. Akerlof, Sandy Baum, Rebecca M. Blank, Hilary Hoynes, Guido W. Imbens, Kirabo Jackson, Rucker Johnson, Helen F. Ladd, David S. Lee, Trevon D. Logan, Michael McPherson, Jesse Rothstein, Robert M. Solow, Sarah Turner, Ebonya Washington, and Douglas Webber—are leading economists and statisticians who regularly use and teach statistical analytical methods, including those used in this case by petitioner's expert, Dr. Peter S. Arcidiacono, and respondent's expert, Dr. David Card. *Amici* include, among others, three Nobel laureates, multiple former federal officials (including from the Department of Commerce, Department of Labor, Council of Economic Advisers, and others), several research associates at the National Bureau of Economic Research, current and former editors of peer-reviewed journals, and multiple professors whose research focuses on higher education. *Amici* have a wide range of views about the appropriateness of using race as a factor in college admissions. They share the view, however, that Dr. Card is one of the most outstanding and respected scholars in the field of econometrics and applied economics, that his statistical analyses in this case were methodologically sound, and that the criticisms of the lower courts' consideration of Dr. Card's analyses in the Brief of Economists as *Amici Curiae* in Support of Petitioner in this Court, No. 20-1199 (U.S.

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[1] Pursuant to Supreme Court Rule 37.6, counsel for *amici* represent that they authored this brief in its entirety and that none of the parties or their counsel, nor any other person or entity other than *amici* or their counsel, made a monetary contribution intended to fund the preparation or submission of this brief. Pursuant to Rule 37.3(a), counsel for *amici* also represent that all parties have consented to the filing of this brief.

May 9, 2022), are not credible. Biographies of *amici* are summarized in the Appendix to this brief.

STATEMENT OF THE CASE

A. Principles of Regression Analysis Design

Economists are often called upon to study the relationships between inputs and outcomes. When examining those relationships, it is important to have a means to control for confounding information. Without appropriately isolating the effects of individual variables, it is easy to reach an incorrect and ill-informed conclusion.

For example, consider the way this Court decides which cases to review. Each year, the Court receives petitions for certiorari requesting review in thousands of cases. It could not realistically hear all of them; accordingly, the Court selects a relatively small handful of cases to review by granting certiorari. It also expressly sets out some of the considerations that warrant its review, such as whether there is a split between circuits or whether the case presents an important question of federal law. *See* Sup. Ct. R. 10 (identifying "the character of the reasons the Court considers" in reviewing certiorari petitions).

Although the Court's internal deliberations about which cases to review are private, its decisions to grant or deny certiorari are announced publicly, which allows members of the public to analyze trends in the data about the Court's decisions. One stark distinction appears in the rates at which this Court grants review of cases that paid the $300 docketing fee compared to cases filed by indigent parties for whom the filing fee is waived ("*in forma pauperis*" cases), as shown in the table below.

Table: Percentage of Petitions Granted by Term[2]

	2017	2018	2019	2020
Fee Paid	4.0%	4.7%	3.7%	3.9%
Fee Waived	0.2%	0.2%	0.1%	0.1%

Looking only at these headline numbers could lead someone to the (presumably false) conclusion that this Court is "discriminating" against indigent petitioners as compared to fee-paying petitioners. In reality, much of the difference between these two categories may disappear upon controlling for other important aspects in this Court's decisions to review cases. Indigent petitioners, for example, may frequently be prisoners challenging the factual findings underlying their criminal convictions. *Cf.* Sup. Ct. R. 10 (explaining that the Court is unlikely to grant review "when the asserted error consists of erroneous factual findings"). They may bring cases that are less likely to present a circuit split or a question of statutory or constitutional interpretation. *Cf. id.* So before accusing this Court of discrimination, a researcher should take care to make sure those other factors are properly controlled for.

Regression analysis is a statistical tool that statisticians, economists, and many other researchers use for inquiries of this sort. Regression analysis allows researchers to understand the relationship between multiple variables. It can show what impact a factor has on an outcome, when holding all other factors included in the analysis constant. That makes it a

[2] "Term" refers to this Court's Terms beginning in October of the year shown (e.g., October Term 2017). Table data sources: *Supreme Court—The Statistics*, 132 Harv. L. Rev. 447, 455 (2018); 133 Harv. L. Rev. 412, 420 (2019); 134 Harv. L. Rev. 610, 618 (2020); 135 Harv. L. Rev. 491, 498 (2021).

potentially useful tool for a case like this one, in which a large number of factors may bear upon an ultimate outcome.

Designing regression analyses necessarily requires professional judgment. *See* James H. Stock & Mark W. Watson, *Introduction to Econometrics* 231-35, 260-61 (4th ed. 2020) ("Stock & Watson"); Daniel L. Rubinfeld, *Reference Guide on Multiple Regression*, *in* Fed. Jud. Ctr. & Nat'l Rsch. Council, *Reference Manual on Scientific Evidence* 303, 312 (3d ed. 2011) ("*Reference Manual*"). That judgment extends to, among other things, which variables to include or exclude. *See* Stock & Watson 261. One may exclude certain information from a regression analysis because the information is irrelevant or including it would bias the results.[3]

While economists do have a degree of judgment in creating a model, their judgment is bounded by established principles of empirical data analysis that mitigate against the likelihood of a biased or unreliable result. A few key principles are at issue in this case.[4]

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[3] As an example, Harvard applications include the names of the applicant's parents. Accordingly, it is technically possible to include "number of letters in mother's first name" as a variable in a regression analysis. Both Dr. Card and Dr. Arcidiacono implicitly opted not to include that information as a variable, and for good reason: there is no reason to believe that this information is relevant for an applicant's chances of admission.

[4] The district court *amicus* brief to which many of these same *amici* were signatories, Am. Br. of Professors of Economics as *Amici Curiae* in Supp. of Defendant, No. 1:14-cv-14176-ADB, ECF No. 531 (D. Mass. Sept. 6, 2018), offered as an illustration of these principles the example of a car dealership seeking to analyze the factors that influence its monthly sales. That illustration retains its usefulness here, and this brief refers to it for further reference should the Court find it helpful.

First, the expert must identify the explanatory variables, which are related to the variable of interest and also are expected to be correlated with the outcome. By controlling for these variables, the regression model will attempt to remove from the raw correlation between the variable of interest and the outcome the correlation attributable to the explanatory variables. *See Reference Manual* 313-16.

Failing to include a relevant explanatory variable will lead to misleading inferences from the data. This statistical problem is known as "omitted variable bias." As a simple illustration, consider a model to analyze whether a petitioner's indigent status affects the likelihood of this Court granting the petition for review, and suppose that model failed to take account of whether the petition involved a circuit split. That model could suffer from omitted variable bias if in fact the fee-waived petitions are less likely to involve circuit splits.

Second, a well-designed statistical analysis should reflect as closely as practical the population of interest and correctly identify the outcome being investigated. *See* Stock & Watson 332 ("the true causal effect might not be the same in the population studied and the population of interest . . . because the population was chosen in a way that makes it different from the population of interest"). Returning to the hypothetical model of this Court's certiorari grants, if the model excluded petitioners in state prisons, or if it considered only petitions involving First Amendment claims, it would fail to reflect the population of interest, which is all parties who file petitions for review in this Court.

Third, in evaluating a regression analysis, the modeling choices should be justifiable *a priori*, without first looking at relationships in the data. *See id.* at

334-35. A researcher should be able to accept the arguments underlying the regression specification (that is, the selection of variables and relevant population) without having seen the results first. And an available explanatory variable should be excluded only when there is a compelling *a priori* explanation to exclude it. If the arguments depend on the specifics of what was observed in the data, they may reflect *ex post* rationalization of the model rather than a principled prior decision. Using the same hypothetical certiorari analysis, a researcher should likely include as a variable whether the case involves the invalidation of a state law based on a federal statute. *Cf.* Sup. Ct. R. 10 (Court considers whether there is an "important federal question"). Suppose a researcher excluded that variable and justified the exclusion by arguing that a disproportionately high percentage of such petitions were granted in a recent Term and that they were overwhelmingly associated with paid cases. That researcher's model would not be complying with the *a priori* principle, and would be suspect, because the rationale depends on analyses of the data rather than *a priori* reasoning.

B. The Experts' Regression Analyses

In the district court, both parties submitted regression analyses. Petitioner's expert, Dr. Peter S. Arcidiacono, performed a regression analysis and concluded that Asian American identity has a statistically significant negative effect on the probability of admission relative to white applicants. Pet.App.197. Dr. Arcidiacono's findings were influenced by certain methodological decisions he made in designing his regression analysis. For example, Dr. Arcidiacono excluded so-called "ALDC" applicants (recruited athletes, "legacy"

relatives of alumni, "Dean's List" applicants, and children of faculty and staff). He also pooled together all applicant data from across six admission class years rather than evaluating them on a year-by-year basis. Pet.App.198.

Harvard offered rebuttal testimony from Dr. David Card. Subsequent to his engagement in this case, Dr. Card was awarded the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel (more commonly called the Nobel Prize in Economics). He is a leading economist with a stellar professional reputation.

Based on his review of the record on Harvard's admissions process and his analyses of admissions data, Dr. Card concluded that Dr. Arcidiacono's analyses were not credible. Dr. Card concluded that Dr. Arcidiacono's regression models mistakenly focused on applicants' academic achievements (such as GPAs and ACT/SAT scores) to the exclusion of other pertinent non-academic information Harvard considered in making admissions decisions, such as applicants' personal factors. *See* CAJA2845:13-2846:13, 2985:4-15, 6048;[5] Expert Report of David Card ¶¶ 12-13, No. 1:14-cv-14176-ADB, ECF No. 419-33 (D. Mass. Dec. 15, 2017) ("Card Report"). Dr. Card also concluded that Dr. Arcidiacono incorrectly narrowed the relevant population by excluding ALDC applicants. Dr. Card opined that there was no statistical justification for removing these applicants from an analysis of Harvard's admissions process. Similarly, Dr. Card found that Dr. Arcidiacono had inappropriately pooled all of the applicants from six admissions cycles into a single

[5] References to "CAJA" are to the Joint Appendix filed in the First Circuit (No. 19-2005). References to "JA" are to the Joint Appendix filed in this Court by petitioner.

model, rather than analyze each year of admissions data separately.

Dr. Card then performed his own analysis, which corrected for the flaws in Dr. Arcidiacono's model. Among other things, Dr. Card's model included ALDC applicants (on the theory that they are part of the population of Harvard applicants and compete with other applicants for admission), and it examined each admissions cycle separately (on the theory that each year's applicants compete only with applicants from that year, not from prior or subsequent years). CAJA2904:6-2905:08, 2918:25-2921:15. Dr. Card also controlled not only for applicants' academic, extracurricular, and athletic qualities (for which Dr. Arcidiacono controlled) but also for other factors including personal ratings, parental occupation, and intended career (for which Dr. Arcidiacono failed to control adequately). *See* CAJA2895:6-2896:4, 6048; Card Report ¶¶ 95-100.[6] Controlling for these factors helped make Dr. Card's analysis robust and persuasive. Through his regression models, Dr. Card analyzed the

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[6] Petitioner's *amici* advance a new argument that, as we understand it, neither *amici* nor petitioner raised at any prior stage of this case. They contend (at 15 n.6) that parental occupation may serve as a proxy for whether an applicant is Asian American, on the grounds that "Asian-American applicants are much more likely than other applicants to have parents in STEM fields." Petitioner's *amici* notably offer no supporting citation for that assertion, which appears to be based entirely on the same stereotypes that petitioner decries. *See* Pet. Br. 63 ("Every day, Asian Americans are stereotyped as . . . model minorities who are interested only in math and science."). As noted above, a well-designed regression analysis should include or exclude variables based on *a priori* evidence and reasoning. Dr. Card's analysis did so; petitioner's *amici*, on the other hand, appear to be relying on a post-hoc, stereotype-driven assertion to try to explain away statistical findings that undermine their preferred result.

difference in admissions rates between Asian American applicants and white applicants if all observed factors included in the regression model were equal. Dr. Card found no statistically significant evidence of racial discrimination against Asian American applicants. CAJA3108:23-3109:15.

C. The District Court's Findings of Fact

Following a bench trial at which both Dr. Arcidiacono and Dr. Card testified, the district court ruled in Harvard's favor. In finding that Harvard's admissions process did not discriminate against Asian American applicants, the court issued a detailed opinion evaluating both parties' statistical analyses and trial testimony.

Although it found "both experts' approaches" were "defensible," Pet.App.198, the court ultimately found Dr. Card's model more persuasive and chose to "rely on" Dr. Card's model while rejecting Dr. Arcidiacono's, Pet.App.203. In particular, the court agreed with Dr. Card that ALDC applicants should be included in the applicant population and that each year of applicants should be considered separately. It reasoned that "excluding ALDCs distorts the analysis" because they are evaluated through the same admissions process as other applicants. Pet.App.170 n.43, 199-200. Similarly, the court concluded that Dr. Card's year-by-year analysis better reflected the realities of Harvard's admissions process; applicants in any given year are competing only against other applicants in that same year. Pet.App.201.[7]

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[7] The effect of these choices is significant. For example, even with all of Dr. Arcidiacono's other modeling choices, simply including ALDC applicants reduced the average marginal effect of Asian American identity on admissions outcome by 25%.

The court also made certain small modifications to Dr. Card's model. Most significantly, Dr. Card had included the personal rating in his model, and petitioner had argued that this introduced "included variable bias." Accordingly, the court considered two forms of Dr. Card's model, both "with and without the personal rating." Pet.App.199. It explained that, "although the Court believes that including the personal rating results in a more comprehensive analysis, models with and without the personal rating are econometrically reasonable and provide evidence that is probative of the effect of race on the admissions process." *Id.*[8]

With the personal ratings variable included, the model adopted by the district court showed no statistically significant evidence of discrimination against Asian American applicants. JA1803 (overall marginal effect of -0.08%). In fact, Dr. Card's model without modifications shows "a slight *positive* average marginal effect for Asian American identity in *three of the six admission cycles* that the experts analyzed." Pet.App.203 (emphases added).

CAJA2402:4-18. And the district court, of course, did not accept all of Dr. Arcidiacono's other modeling choices.

[8] The court also added one feature of Dr. Arcidiacono's model to Dr. Card's: an interaction term between race and disadvantaged status. Pet.App.198-99.

Class	Average Marginal Effect of Asian-American Ethnicity (Percentage Points; Not Statistically Significant)
2014	-0.39
2015	-0.05
2016	0.09
2017	0.11
2018	-0.42
2019	0.34
Overall	**-0.05**

CAJA2883:24-2885:11, 6044.

Even without the personal ratings variable, "the lower probability of admission to Harvard that appears associated with Asian American identity is slight, with an average marginal effect of Asian American racial identity on admissions probability that is well below minus one percentage point." Pet.App.203; *see* CAJA3149:9-3151:23; Card Report ¶ 152 & Ex. 21 (overall marginal effect of -0.34%). And that result is explained almost entirely by a single anomalous year: while one year in the model without personal ratings had a relatively strong correlation between Asian American identity and admission, the other five years showed no statistically significant correlation. *See* CAJA3150:1-3152:3, 5700, 5703; Card Report ¶¶ 147, 152-153 & Exs. 19, 21-22. The natural interpretation of that result would be that, according to the statistical evidence in Dr. Card's model, there was no consistent evidence of bias for or against Asian American students, holding all other factors constant.

Taking into account both of these results, the court concluded that "statistical disparities between applicants from different racial groups on which SFFA's case rests are not the result of any racial animus or conscious prejudice." Pet.App.247.

D. The Court of Appeals' Affirmance

On appeal, petitioner argued that the district court erred in considering Dr. Card's regression model including the personal ratings variable. Petitioner did not challenge the district court's conclusion that Dr. Arcidiacono's admissions outcome models were unpersuasive due to his improper treatment of the population (by excluding ALDC applicants and pooling applicants across class years). Instead, petitioner focused its argument principally on the inclusion of the personal ratings, arguing that the district court's consideration of the model including them was clearly erroneous. *See* Pet.App.95; Br. of Appellant at 29-43, No. 19-2005 (1st Cir. Feb. 20, 2020).

The court of appeals affirmed. It concluded that the district court properly considered Dr. Card's model with personal ratings because "the model would suffer from omitted variable bias" without them. Pet.App.94. The court of appeals observed that "the statistical model using the personal rating showed no discrimination against Asian Americans." *Id.* It noted that excluding the personal ratings model yields a slightly negative overall effect with statistical significance, but only in one year out of six on a year-by-year basis. Pet.App.96. Accordingly, it found no clear error in the district court's factual conclusion that the statistical evidence did not suggest any conscious prejudice against Asian American applicants. Pet.App.98.

SUMMARY OF ARGUMENT

Based on our collective decades of training and experience in statistical methods, we are unanimous in our view that Dr. Card's analysis, as accepted by the district court, was credible and consistent with principles of statistical modeling. We are also unanimous in our view that petitioner's and its *amici*'s critiques of Dr. Card's analysis and the lower courts' reliance thereon are misplaced.

First, Dr. Card's decision to include personal ratings as a control variable was appropriate as a matter of sound statistical principles, and the lower courts properly concluded that excluding personal ratings likely leads to omitted variable bias. Petitioner's *amici*'s argument to the contrary is meritless, and it is misplaced in any event: even if personal ratings were excluded, the statistical evidence still would not support the position petitioner and its *amici* advocate.

Second, for related reasons, the assertion by petitioner's *amici* (at 21) that there is "compelling statistical evidence" making this case an "optimal vehicle" for the questions presented is incorrect. The statistical evidence accepted by the district court and affirmed by the court of appeals—namely, Dr. Card's analysis with minor modifications—does not support an assertion that Harvard discriminated against Asian American applicants.

Third, petitioner's *amici* argue that Dr. Card should have compared Asian American applicants to black and Hispanic applicants rather than white applicants. This argument not only contradicts the approach that *petitioner's* own expert took, but also is inconsistent with generally accepted practice among experts in this field.

ARGUMENT

I. THE LOWER COURTS PROPERLY CONSIDERED DR. CARD'S MODEL WITH THE PERSONAL RATINGS VARIABLE

In the court of appeals, petitioner did not contest the district court's decision to adopt Dr. Card's model over Dr. Arcidiacono's. Rather, the sole dispute petitioner raised with respect to the district court's consideration of the regression analyses, as we understand it, was whether the district court erred in considering the version of Dr. Card's model that included the personal ratings variable (along with one that excluded it). The model that included the personal ratings showed no statistically significant effect of Asian American identity on admissions outcome when controlling for all other factors in the model. The district court credited and relied on that model. Pet.App.203; JA1803.

At least as a matter of statistical evidence, that finding of no statistically significant correlation supports the lower courts' conclusions and does not support petitioner's theory; in general terms, it means that the statistical evidence provides no credible basis to believe that Harvard's admissions decisions involved significant discrimination with respect to Asian American applicants (either in favor of or against). As a result, petitioner and its *amici* strain to argue that the personal rating should have been excluded. But Dr. Card's model including the personal rating, and the lower courts' acceptance of it, were sound as a matter of statistical principles. The arguments petitioner's *amici* now raise in opposition are meritless and misconstrue much of the statistical evidence. And, in any event, even if the personal rating was included as petitioner and its *amici* advocate, that still would not provide statistical evidence consistent with petitioner's narrative.

A. Inclusion of the Personal Ratings Variable Is Methodologically Justified

Dr. Card's decision to include the personal ratings variable was consistent with the fundamental empirical modeling principles described above. Harvard expressly considered personal ratings in evaluating applicants' qualifications, and they provide data that are not captured by any of the other variables in the model. Excluding that variable would therefore likely result in an overstatement of the effect of race in the admissions process as a result of omitted variable bias. Accordingly, as a matter of sound statistical principles, it was appropriate for Dr. Card to include the personal ratings variable in his model and for the lower courts to accept the model that included it. The district court appropriately concluded that this made Dr. Card's model that included the personal ratings variable the "more comprehensive analysis." Pet.App.199; *see* Pet.App.87.

Petitioner argues (at 73) that the data show a correlation between personal ratings and Asian American identity, and infers from the correlation that the personal rating must be the tool through which Harvard applies an "anti-Asian penalty." From that, petitioner's *amici* argue (at 24-25) that the personal rating should have been excluded from the model, because otherwise the model would incorrectly suggest there is no racial discrimination. As we noted above, however, an available explanatory variable should be excluded only when there is a compelling *a priori* explanation for excluding it, such as if it is clear that the proposed explanatory variable had no independent effect on the outcome and on the variable of interest, or if the values of the variable were assigned based on race. *See supra* p. 6. Justifying the inclusion

or exclusion of a variable based on *ex post* analyses of the data violates sound principles of modeling, because it allows the modeler to inject his or her own subjective or results-driven views, disguised as empirical decisions. *See id.*

Petitioner's *amici* commit that error here. Neither Dr. Arcidiacono, nor petitioner, nor petitioner's *amici* identify any *a priori* qualitative evidence suggesting that admissions officers consider an applicant's race in assigning personal ratings. To the contrary, the district court repeatedly noted that Harvard's admissions officers "credibly testified that they did not use race in assigning personal ratings (or any of the profile ratings) and did not observe any improper discrimination in the admissions process." Pet.App.190. This "consistent, unambiguous, and convincing" testimony, Pet.App.264, is an appropriate *a priori* justification for *including* the personal ratings variable. There was no similarly compelling reason to *exclude* the variable. Rather, the only reason petitioner and its *amici* offer is that, upon an *ex post* review of the data, they believe race appears to have some influence on personal ratings. That is not a sufficient basis to exclude the personal rating as a matter of sound modeling principles; it is certainly not a sufficient basis to say that the lower courts clearly erred in considering it.[9]

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[9] Petitioner's *amici* also argue at length (at 7-10) that the overall ratings should have been excluded for the same reason. That argument confuses the issue. Neither Dr. Arcidiacono nor Dr. Card used the overall ratings as an input to their regression analyses of admissions outcome, and there is no dispute that this was the right approach in this case. *See* Pet.App.195. The reason for excluding the overall ratings was sound: unlike with the personal rating, there was (as petitioner's *amici* themselves acknowledge) a strong *a priori* reason to believe that race affected the overall ratings—namely, Harvard's overt use of racial "tip[s]"

Moreover, Dr. Card's and the lower courts' inclusion of the personal ratings is affirmatively justified because excluding the personal ratings would have increased the risk of omitted variable bias. The record shows that the personal ratings score reflects data that bear on Harvard's admissions decisions but is not reflected elsewhere. For example, personal ratings are assigned based in part on teacher and guidance counselor recommendation letters. Pet.App.191-92. And, in fact, teacher and guidance counselor letters help explain much of the racial disparities that petitioner and its *amici* point to in the personal ratings. *Id.* Petitioner's *amici* are wrong as a matter of accepted modeling standards when they insist (at 27-29) that these data should have been excluded.[10]

Dr. Card's model identified other relevant observable data as well. He used Dr. Arcidiacono's "non-academic admissions index"—which summarizes an applicant's strength across all non-academic factors—to show that Asian American applicants are less likely than white applicants to be in the top deciles of the index, again suggesting that white applicants may outperform Asian American applicants in non-

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when assigning overall ratings. Pet.App.137-38, 196. Excluding the overall ratings was therefore an appropriate step in an analysis aimed at determining whether race influences admissions outcomes while holding all other relevant factors equal.

[10] Petitioner's *amici* argue (at 28) that, if the reason why white applicants receive stronger support letters from teachers and guidance counselors than do Asian American applicants is that the teachers and guidance counselors themselves were racially biased, that would be a reason to exclude the personal ratings from the model. But neither petitioner nor its *amici* have shown that any racial disparities in support letters are a result of racial bias (indeed, they do not appear to have even attempted to do so). To the contrary, the lower courts found no clear evidence of such racial bias. Pet.App.92 & n.41; Pet.App.193.

academic measures. CAJA2971:1-3, 3005:17-3010:18. Moreover, Dr. Arcidiacono's own regression models show that racial disparities in the personal ratings shrink as he adds more non-academic factors. CAJA2425:13-17. All of this evidence suggests that omitted variables, not racial bias, may explain the observed racial disparities in admissions. Here, because the observable data are correlated with race, it was reasonable for the district court to conclude that unobservable factors would likely be correlated with race as well—which implies that the effect of race on admissions was overstated without the personal ratings variable due to omitted variable bias.

Despite their protests, petitioner's *amici* cannot escape from the fact that excluding the personal ratings variable necessarily omits various dimensions that play a key role in Harvard's admissions decisions. No other variables could adequately control for the quality of personal essays, recommendation letters, and school support materials—among other missing data—even though Harvard considered these in the admissions process. Failing to include a significant explanatory variable like the personal ratings may cause race to be credited with an effect that is actually caused by the excluded variables. For this reason, the district court's consideration of Dr. Card's model that included the personal ratings variable does not conflict with statistical methods; in fact, it is in line with sound modeling principles.

B. Petitioner and Its *Amici* Misconstrue the Record in Attacking the Personal Rating

Petitioner and its *amici* offer other arguments against the personal ratings that misconstrue statistical evidence in various other ways. We offer a brief corrective to certain of those misstatements.

First, petitioner's *amici* argue (at 26) that Dr. Arcidiacono's regression model of the personal ratings showed "little risk" of omitted variable bias, so the lower courts should have accepted it instead of Dr. Card's model. That is incorrect. The risk of omitted variable bias becomes obvious after examining Dr. Arcidiacono's models for the "academic rating" and "extracurricular rating." Those two models indicate that, holding all other factors in the models equal, Asian American applicants receive *higher* academic and extracurricular ratings—in other words, that there is discrimination *in favor* of Asian American applicants. CAJA2970:22-25, 2981:5-18. If accepted at face value, Dr. Arcidiacono's models would indicate that Harvard discriminates against Asian American applicants on one subscore only to discriminate in favor on two others—a finding that he himself has acknowledged is not plausible. The more realistic explanation for these findings is that Dr. Arcidiacono's regression models are simply not reliable enough to measure all the applicant qualities that determine Harvard's assignment of these ratings—i.e., that they are subject to omitted variable bias. CAJA2979:4-2980:21, 2981:5-2984:2.[11] The assertion by petitioner's *amici* that there was "little risk" of omitted variable bias in Dr. Arcidiacono's analysis is counter to the statistical evidence. The lower courts did not err in rejecting that analysis.

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[11] For example, an applicant's essay and recommendation letters may indicate strengths that are captured in the academic and extracurricular scores, just as they may indicate weaknesses captured in other scores; in either case, any disparities cannot be attributed to bias because these strengths and weaknesses are not controlled for directly. Even Dr. Arcidiacono agrees that his findings of racial disparities in the academic and extracurricular ratings are attributable to missing, unobservable data, not racial bias. CAJA2447:21-2448:8.

Second, and relatedly, petitioner's *amici* criticize (at 26-28) the lower courts for speculating about the reasons for racial disparities in observed school support ratings (which reflect the overall strength of teacher and guidance counselor recommendations, and in turn inform Harvard's admissions decisions). *See also* Pet. Br. 35-36, 74. Even assuming any such speculation occurred (we do not purport to speak for the lower courts or say what conclusions were necessary to their holdings), this criticism by petitioner's *amici* is misplaced. There are countless ways that race could be associated with a student's high school achievements, personal essays, and recommendation letters, and many of them cannot be expressed as quantifiable variables. This is an example of "non-observable data," and the statistical remedy to prevent non-observable data from biasing a model's results is to include as much relevant observable data as possible. It is precisely because there are so many ways that omitted variables can reflect racial disparities that it is important not to compound the problem by omitting known, quantifiable variables like the personal ratings. The lower courts correctly observed that a model excluding personal ratings may not adequately account for those non-quantifiable aspects of applicants' qualifications. Accordingly, contrary to the arguments by petitioner's *amici*, this was yet another valid reason for the lower courts to embrace Dr. Card's model rather than Dr. Arcidiacono's.

Third, petitioner's *amici* accuse the court of appeals (at 22) of "profound[ly] misunderstanding . . . the record," because that court referred to Dr. Card's model excluding the personal rating as "*Petitioner's* preferred model." This appears to be little more than a semantic game; we see no evidence of any misunderstanding of statistical principles. Petitioner

has argued throughout this litigation that the personal ratings variable should be excluded from the regression model. After the district court decided to rely on two models (the version of Dr. Card's model with the personal ratings variable, and the version without it), it was accurate to describe the version without the personal ratings variable as the one petitioner "preferred." We are not aware of any reason to believe that this naming shorthand led to any error with respect to the application of sound statistical principles in the court of appeals.

C. Excluding Personal Ratings Still Would Not Yield Statistical Evidence Supporting Petitioner's Theory

Dr. Card's inclusion of personal ratings in his model was appropriate, and the district court's consideration of that model including personal ratings was not clear error. But even if that were wrong, excluding personal ratings in the model still would not yield statistical evidence supporting petitioner's theory.

Petitioner's *amici* misconstrue the economic evidence. They insist (at 24) that Dr. Card's regression model excluding the personal ratings variable shows "significant" racial discrimination. That is a misuse of the relevant statistical concept. Dr. Card's model without personal ratings shows a *statistically* significant effect of Asian American identity, meaning an effect unlikely to be explained by random chance; but that effect is only "slightly negative" in terms of its magnitude. Contrary to petitioner's *amici*'s argument (at 23), the court of appeals correctly interpreted the result as showing a relatively small effect of Asian American identity, compared to substantially larger effects from other factors (for example, across all applicants, high school and neighborhood characteristics explained the admissions outcomes 30 times

better than race; intended major and intended career each did so five times better, CAJA3036:10-3037:22, 6107). And other analyses Dr. Card performed show that even this small effect may be illusory: it largely disappears if Dr. Arcidiacono's "race-disadvantage" interaction variable is removed. Pet.App.203; CAJA3150:1-3152:3.

Analyzing the data on a year-by-year basis, as Dr. Card did and as the district court endorsed, it becomes clear that the slightly negative overall effect from his model without personal ratings was driven by one highly statistically significant correlation in a single year. *See* CAJA3150:1-3152:3, 5700, 5703; Card Report ¶¶ 147, 152-153 & Exs. 19, 21-22. In other words, five out of six years of Harvard admissions data showed no statistically meaningful correlation between Asian American identity and admissions chances, even when excluding the personal rating as petitioner's *amici* advocate. To be sure, the remaining one year did show a statistically significant relationship. But we are not aware of any persuasive qualitative explanation for that result; petitioner has not, for example, argued that Harvard opted to discriminate against Asian American applicants in only one year out of six, nor articulated any reason why it would have done so. Accordingly, even if petitioner's *amici* were correct that the personal rating should be excluded, the statistical evidence still does not demonstrate that Harvard's admissions officers discriminated against Asian American applicants on even a remotely consistent basis. *Contra* Pet. Br. 72 (arguing that Harvard "has repeatedly penalized" Asian Americans).

II. PETITIONER'S *AMICI* MISSTATE THE MEANING OF THE STATISTICAL EVIDENCE IN THIS CASE

Petitioner's *amici* insist (at 21) that "the compelling statistical evidence of discrimination in the record makes this case an optimal vehicle" "to revisit the legality of racial discrimination in college admissions." We express no view on the legal question at issue, but we are unanimous in our view that petitioner's *amici* sorely misstate the record.

As noted above, the statistical evidence accepted by the district court consisted of two modified versions of Dr. Card's model: one that included personal ratings and one that excluded it. And, as noted above, the former version found no statistically significant effect of Asian American identity at all (i.e., no statistical evidence of discrimination against Asian American applicants), while the latter found a statistically significant effect in just one year out of six. That is not "compelling statistical evidence of discrimination"; to the contrary, it is a noteworthy *absence* of statistical evidence of systematic discrimination in Harvard's admissions decisions on the basis of Asian American identity—even though one would expect to find such evidence if petitioner's theory were correct.

We express no view on whether non-statistical evidence might make this case an "optimal vehicle" for the legal question presented. But we disagree with petitioner's *amici* as to the statistical evidence; we do not see how a case in which the best statistical evidence suggests an *absence* of discrimination would be an "optimal vehicle" for addressing the legality of discrimination.

III. THE OTHER ARGUMENTS RAISED BY PETITIONER'S *AMICI* FAIL

Petitioner's *amici* also raise a pair of new arguments against Dr. Card's model. As we understand it, neither petitioner nor its *amici* raised those arguments in the district court or on appeal. In any event, these new arguments uniformly fail on their merits.

First, petitioner's *amici* contend (at 21) that the district court improperly focused on the comparison between Asian American applicants and white applicants, and instead should have compared Asian American applicants to those of other minority groups, particularly African Americans. That suggestion lacks merit as a matter of empirical analysis.

As an initial point, both Dr. Card and Dr. Arcidiacono used white applicants as the reference group against which to compare Asian American applicants. CAJA2239:24-25, 2884:3-8. So, too, did the federal Office of Civil Rights analysis from the 1990s on which petitioner relies. CAJA4477; Pet. Br. 26-27. If petitioner's *amici* were correct, they would have a Pyrrhic victory, because petitioner would be left with no statistical evidence supporting its position either.

But petitioner's *amici* are not correct as a matter of economic principles. Dr. Card's (and Dr. Arcidiacono's) decision to use non-minority (i.e., white) applicants as the reference group rather than using another minority group has strong justification. As a matter of empirical analysis, the best reference group to use is a majority group that is unlikely to experience the type of bias, positive or negative, for which a researcher is testing. At trial, Dr. Card justified his choice of white applicants as the reference group on this basis. CAJA2878:4-14. That is consistent with accepted practice among experts in this field: the

econometric literature reveals that studies of racial disparities almost always use whites as the reference group.[12] Dr. Card's (and Dr. Arcidiacono's) choice of reference group is consistent with this principle and well-established expert practice; *amici*'s contrary suggestion is not, and they notably cite no authority for their position.

Petitioner's *amici* are mistaken for the additional reason that their suggested approach would produce an estimate of the effects of Asian American identity with much lower statistical power than the results presented at trial. Statistical power refers to the likelihood that the model will detect a statistical relationship if in fact one exists. *See* Stock & Watson 115. Generally speaking, statistical power decreases when the size of the population of interest decreases; in simplified terms, this means the size of the statistical "error bars" forming a confidence interval around any point estimate will be larger when dealing with smaller samples. African American and Hispanic applicants each account for only about 10% of the domestic applicants to Harvard each year—approximately one-sixth of the size of the pool of white applicants. JA1820. Accordingly, adopting the approach

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[12] *See*, *e.g.*, Peter Arcidiacono, *Affirmative Action in Higher Education: How Do Admission and Financial Aid Rules Affect Future Earnings?*, 73 Econometric Soc'y 1477, 1450 (2005); Thomas J. Espenshade et al., *Admission Preferences for Minority Students, Athletes, and Legacies at Elite Universities*, 85 Soc. Sci. Q. 1422, 1430 (2004); Kate Antonovics & Ben Backes, *The Effect of Banning Affirmative Action on College Admissions Policies and Student Quality*, 49 J. Hum. Res. 295, 311 (2014); Danny Yagan, *Supply vs. Demand under an Affirmative Action Ban: Estimates from UC Law Schools*, 137 J. Pub. Econ. 38, 45 (2016); Julie R. Posselt et al., *Metrics First, Diversity Later? Making the Short List and Getting Admitted to Physics PhD Programs*, 25 J. Women & Minorities Sci. & Eng'g 283, 297 (2019).

that petitioner's *amici* now urge would increase the risk of generating confidence intervals so wide that it would be impossible to say as a matter of statistics whether there was any effect at all. That concern is particularly salient here given the hundreds of control variables used in the experts' regression models in this case.

Finally, even if petitioner's *amici* were correct on the statistical principles, neither they, nor petitioner, nor Dr. Arcidiacono have attempted to conduct a regression analysis in this way. Petitioner's *amici* do not and cannot say what the result of such a regression analysis would be. Proper statistical analysis requires doing a statistical analysis; merely speculating about what the results of an analysis *might* show is no substitute.

Second, petitioner's *amici* also argue (at 20) that race-based "tips" for African American and Hispanic applicants "significantly increase the[ir] chance of admission . . . and therefore necessarily decrease the chance of admission for whites and Asian Americans." This argument falsely assumes that the strength of applicants in each applicant group has the same distribution. Simply comparing the average admissions rates of each racial group does not prove the effect of race on individual applicants' chances of admission, especially given the significant variation in applicants' qualifications within each group, CAJA2834:1-7—just as the earlier example of the average rate of this Court's decisions to review paid and fee-waived cases does not represent any credible evidence of discrimination on the basis of the petitioners' financial means.

Petitioner makes the same error in pointing to the differences in average admissions rates as evidence of racial discrimination, including in its reliance

on Dr. Arcidiacono's analysis of academic deciles. *See* Pet. Br. 23-24. The district court held that this analysis was inapt because it omitted other important explanatory variables, Pet.App.181, and even Dr. Arcidiacono admitted that its explanatory value was limited, CAJA2235:24-2236:14, 2346:16-2348:2. That is because a high-level analysis like this one fails to take into account relevant variables that can explain the real reasons for superficial disparities in the data, as the example of this Court's decisions to review cases showed. The need to control for other factors is precisely why regression analyses are important; petitioner's and its *amici*'s speculation outside the context of a regression analysis, and therefore outside the context in which other variables are controlled for, has no meaningful import.

CONCLUSION

The lower courts did not clearly err in accepting Dr. Card's statistical analysis. The Court should affirm the lower courts' rulings with respect to the statistical evidence presented.

Respectfully submitted,

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