Divergent: The Time Path of Legacy and Athlete Admissions at Harvard*

Peter Arcidiacono
Duke University
NBER & IZA

Josh Kinsler
University of Georgia

Tyler Ransom
University of Oklahoma
& IZA

June 29, 2020

Abstract

Applications to elite US colleges have soared over the past 20 years, with little change in available seats. We examine how this increased competition affected the admissions advantage that legacies and athletes (LA) receive. Using 18 years of Harvard admissions data, we show that non-legacy, non-athlete (NLNA) applications expanded while LA applications remained flat. Yet, the share of LA admits remained stable, implying substantial *increases* in LA admissions advantages. Viewed through the lens of an admissions model, stability in the share of LA admits implies that elite colleges treat the number of LA admits and overall admit quality as complements.

JEL Classification: I23, I24, J15

Keywords: Higher education, College admissions, Legacy, Admissions preference

*We are grateful to Bocar Ba, Tom Nechyba, and Jimmy Roberts for helpful comments. Peter Arcidiacono served as an expert witness for Students for Fair Admissions, Inc. (SFFA) in the *SFFA v. Harvard* case. SFFA is not funding his work on this paper. Josh Kinsler worked as a consultant for SFFA in the *SFFA v. Harvard* case. SFFA is not funding his work on this paper. The views expressed and conclusions reached in this paper are those of the authors; they do not purport to reflect the views of SFFA. To the extent this paper relies on records from the *SFFA v. Harvard* case, it relies solely on the public records from the case.

1 Introduction

Admissions at elite colleges in the US have become increasingly competitive. Application rates have soared with little change in the number of seats available (Smith, 2018). For the Class of 2023, Harvard College received 43,330 applications and only admitted 1,950 (Caldera and Mohammadzadeh, 2019).[1] As a result of the increased competition for a fixed number of seats, the preferences elite colleges give to specialized applicant groups have received greater scrutiny (Desai, 2018). The college admissions scandal that came to light in early 2019 was especially incendiary, in part because it showed that elite colleges' preference for athletes gives further opportunity to applicants from wealthy backgrounds who may not be as academically qualified as the typical admitted student (Chappell and Kennedy, 2019).

In this paper, we examine how increased competition for spots at elite colleges has affected the admissions outcomes of legacies and athletes. We focus on Harvard applicants for the Classes of 2000–2017 where—as a result of the *Students for Fair Admissions v. Harvard* lawsuit—information on admissions for legacies and athletes (LA) and those who are neither legacies nor athletes (NLNA) was made public (see Trial Exhibit DX 042).[2] Admissions information is not separately available for legacy and recruited athlete applicants, and as a result, all of the analysis in this paper combines these two categories.

The overall application trends at Harvard during this time frame parallel the trends in the elite college market, with total applications almost doubling over the period. Yet, the rise in applications to Harvard was driven almost entirely by growth in NLNA applications. Consequently, LA applicants accounted for an increasingly smaller share of the applicant pool, falling from 7.5% to 4%.

To frame how a university might respond to a substantial increase in NLNA applications, we develop a simple theoretical model of university admissions. We show that if a university views the quality of admitted students and the number of LA admits as substitutes, then increasing NLNA applicants will decrease the number of LA admits. As the NLNA applicant pool expands, Harvard would be willing to reduce the number of LA admits in favor of higher quality NLNA applicants. However, student quality and the number of LA admits could

[1] Class refers to the year applicants would graduate from Harvard if they did so in four years.

[2] Legacy applicants have at least one parent who received an undergraduate degree from Harvard.

also be complements if, for example, legacy admits boost fundraising and the productivity of institutional spending is increasing in student quality.[3] In this case, the relationship between the number of the NLNA applicants and the number of LA admits is ambiguous. A substantial increase in NLNA applicants can then result in large changes in the admissions rates of NLNA applicants with little change in the admissions rates for LA applicants. This best describes what we observe at Harvard.

Despite the significant drop in the LA *applicant* share, Harvard data show no time trend in the share of *admits* who are legacies or athletes. This share has been relatively stable over time at an average of 24%. The large difference in the LA share of applicants and admits reflects the very high admit rates for legacies and athletes, with admit rates ranging from 41% to 48% over this period.[4] For the Class of 2000, admit rates were four times higher for legacies and recruited athletes than for NLNA applicants. But by the Class of 2017, admit rates were nine times higher for legacies and recruited athletes.

These descriptive patterns are consistent with increasing advantages given to legacies and athletes over time. However, an alternative explanation is that the large increase in NLNA applications came from uncompetitive applicants. Indeed, in Arcidiacono, Kinsler, and Ransom (2019c) we show that during one part of our time series there was a substantial increase in applications from African Americans with relatively low SAT scores. But the overall evidence suggests that a weakening of the NLNA applicant pool can only play a small role in explaining our findings for at least three reasons. First, the expansion in the bottom of the test score distribution occurred only for under-represented minority (URM) applicants. Focusing only on non-URM applicants shows the same pattern of LA advantages since URMs make up a relatively small share of the applicant pool. Second, we show that the distribution of applicant SAT scores remained stable during the period when NLNA applications expanded the fastest. This pattern is inconsistent with the excess NLNA applications being drawn from the bottom of the applicant quality distribution.

But the most important piece of evidence that the data patterns result from increased

[3] See also Cowen (2017) for a more detailed discussion of this point in the popular press.

[4] Admit rates are heterogeneous within this category. Arcidiacono, Kinsler, and Ransom (2019b) show, using data from the end of this period, that athletes had admissions rates well over 80%, while legacies' admissions rates were over 30%.

advantages given to LA applicants comes from matriculation rates. If LA applicants were receiving increased advantages over time, then the marginal LA admit would be expected to have increasingly worse outside options; that is, the other colleges available for them to attend would be of lower quality. In this case, LA admits should be more likely to matriculate over time.[5] While NLNA matriculation rates slightly decreased over this time period, LA matriculation rates rose substantially. At the beginning of our time series, LA matriculation rates were less than 80%, but by the end of the time period they were over 90%, implying that the rate at which admissions offers were declined by LA admits fell by *more than 50%*. The rising matriculation rates for LA admits suggests that the outside options for LA admits were declining, consistent with the LA advantage rising substantially.

While the growing LA admissions advantages for the Classes of 2000–2017 do not appear to be driven by a relative weakening of the NLNA applicant pool, complementary preferences may still not be the sole driver. An alternative model that also rationalizes this pattern is a quota for LA admits that is constant over this period. A quota for recruited athletes would ensure that the rosters of the varsity teams at Harvard are full. For the admissions cycles covered by the Classes of 2000–2017, the number of varsity sports offered by Harvard was fixed at 40.[6] Yet, over such a lengthy period of time the number of sports offered is itself endogenous, meaning that the recruited athlete quota needs to be motivated by underlying Harvard preferences.[7] But for quotas to be the explanation, there would also have to be a quota for legacies since the total number of LA admits is relatively flat for the Classes of 2000–2017. It is difficult to rationalize a strict quota for legacy admits, which is another reason why we prefer our model with complementary preferences. However, the practical implications of a quota for LA applicants are similar to the predictions of our model: the admissions advantage LA applicants receive must be growing over time to maintain a constant quota in the face of an expanding NLNA applicant pool of unchanging quality.

The favorable treatment that legacies and athletes receive in the admissions process at

[5]Note that LA admits may be more likely to matriculate than NLNA admits due to their specific ties to Harvard; our argument here is about how these matriculation rates change over time.

[6]See Table E1 of Arcidiacono, Kinsler, and Ransom (2019b).

[7]For example, in the spring of 2020, Brown University reduced the total number of varsity sports offered by nine. Prior to this, Brown had offered 38 varsity sports programs, the third most in the nation behind Stanford and Harvard. See Anderson (2020) for additional details.

elite colleges is well documented.[8] In 1990, the Office for Civil Rights concluded its investigation of Harvard and revealed that legacies and athletes were admitted at significantly higher rates than other applicants for the Classes of 1983–1992 (Trial Exhibit P555).[9] A handful of papers also estimate the size of the admissions advantage that legacies and athletes receive, with each showing substantial advantages for these groups.[10] We add to this literature by showing how legacy and athlete advantages have been rising substantially in more recent times, consistent with either a quota for these groups or complementarities between the quality of the student body and the legacy and athlete share.

2 A Model of College Admissions

We begin by considering how changes in the applicant pool affect admissions decisions under different types of university objective functions. Given the tremendous rise in applicants to Harvard and other elite institutions, we are particularly interested in how an increase in the number of applicants—and in particular changes in the number of NLNA applicants—affects admissions decisions differently for LA and NLNA applicants.

We model the university as valuing two characteristics in its admitted class: student quality, $x \in \Re^+$, and whether the student is a legacy, $s \in \{l, n\}$.[11] Student quality refers to all attributes which the university values (both observed and unobserved) other than legacy status. In the population of s-status students, x is distributed according to a cumulative distribution function $\Phi_s(x)$ with a corresponding probability density function $\phi_s(x)$. The university receives N_l legacy applications and N_n non-legacy applications. The university can admit at most $\overline{N}$ students. Consistent with trends in the actual data, we assume that $\overline{N}$ is fixed. We also assume that $\Phi_s(x)$ is fixed. We show later that this is a reasonable assumption.

[8] A number of books have been written on the topic, documenting the advantages legacies and athletes receive in the admissions process and how the process operates differently for the groups. See in particular Bowen and Levin (2003), Karabel (2005) and Golden (2006). Karabel (2005) documents that legacies and, especially, athletes made up a disproportionate share of admits with low academic ratings in 1966 (pp. 289–90), a finding supported in more recent data by Arcidiacono, Kinsler, and Ransom (2019b).

[9] Lamb (1993) illustrates that Yale had similar patterns in admit rates over the same time period.

[10] See Espenshade, Chung, and Walling (2004), Hurwitz (2011) and Arcidiacono, Kinsler, and Ransom (2019b).

[11] For ease of exposition, throughout the model section we use legacy rather than legacy and athlete.

We consider two different ways by which preferences for legacy status can operate, with proofs given in Appendix A.[12] In the first, the university maximizes the sum of x for its admitted students plus an additional term that is an increasing function of the number of admitted legacies. Denote this function as $h(\cdot) : \Re^+ \rightarrow \Re^+$ whose first derivative is positive and second derivative is negative. Clearly, if the university finds it optimal to admit a legacy (non-legacy) student with index x' then it will also be optimal to admit all legacy (non-legacy) students with $x > x'$. There is then a cutoff value of x for both legacy and non-legacy students, c_l and c_n, where students above these cutoffs are admitted. Further, since $h(\cdot)$ is increasing in the number of admitted legacy students, $c_l < c_n$. We then characterize what happens to the number of legacy admits when the number of non-legacy applicants (of constant quality) increases.

Theorem 1 *Suppose the university's maximization problem is given by*

$$\max_{c_l, c_n} N_l \int_{c_l} x\phi_l(x)dx + N_n \int_{c_n} x\phi_n(x)dx + h(N_l[1 - \Phi_l(c_l)])$$
$$s.t.\ \ N_l(1 - \Phi_l(c_l)) + N_n(1 - \Phi_n(c_n)) = \overline{N}.$$

If both legacy and non-legacy applicants are admitted, then increasing the number of non-legacy applicants increases the cutoff for legacy applicants at the solution to the maximization problem, i.e. $\frac{\partial c_l}{\partial N_n} > 0$*. This results in fewer legacy applicants being admitted.*

Proof In Appendix A.1.

When the university's preferences are additive in the quality of the student body and a function of the number of legacy admits, an increase in the number of non-legacy applicants results in a decrease in the number of legacy admits. The increased number of non-legacy applicants means that there are more non-legacy applicants of high quality who crowd out some of the legacies who would have been admitted absent the increase in non-legacy applicants.

[12] In significantly more complicated equilibrium environments, Rothschild and White (1996) and Epple, Romano, and Sieg (2006) treat student quality and resources as complements, while Fu (2014) treats them as substitutes. Our work is related in the sense that legacy preferences are a channel by which schools can boost resources, and thus quality. Three additional papers, Arcidiacono et al. (2011), Chade, Lewis, and Smith (2014), and Kapor (2020), present frameworks for admissions focusing on special status students akin to legacies in our model. These studies view special status students as substitutes for typical students.

A second potential objective function for the university is one in which legacy preferences are multiplicative. Namely, the university could instead maximize the sum of x for admitted students times an increasing function of the number of admitted legacies. Just as in the additive preferences case, denote this function as $h(\cdot) : \Re^+ \rightarrow \Re^+$ whose first derivative is positive and second derivative is negative. As before, the solution to this maximization involves admissions cutoffs c_l and c_n. Under this objective function, an increase in the number of non-legacy applicants may actually increase the number of legacy admits.

Theorem 2 *Suppose the university's maximization problem is given by*

$$\max_{c_l, c_n} \left(N_l \int_{c_l} x\phi_l(x)dx + N_n \int_{c_n} x\phi_n(x)dx \right) h(N_l[1 - \Phi_l(c_l)])$$

$$s.t.\ N_l(1 - \Phi_l(c_l)) + N_n(1 - \Phi_n(c_n)) = \overline{N}.$$

If both legacy and non-legacy applicants are admitted, then, at the solution to the maximization problem, the sign of $\frac{\partial c_l}{\partial N_n}$ *is determined by the sign of:*

$$h'(\cdot)N_n\phi_n(c_n) \left[c_n - \frac{\int_{c_n} x\phi_n(x)dx}{1 - \Phi(c_n)} \right] + h(\cdot) \tag{1}$$

Proof In Appendix A.2.

The sign of $\frac{\partial c_l}{\partial N_n}$ is then the sum of two terms. The second term is positive. Now consider the first term. Each of the terms multiplying the term in brackets is positive. What is inside the brackets is negative: as a condition of admission, the cutoff value for non-legacies must be less than the expected value of x for admitted non-legacies. The larger in magnitude this term is, the larger the gains are for adding more legacy admits. These gains are tempered by $h'(\cdot)$: when there are already many legacy admits, the curvature of $h(\cdot)$ diminishes the gains from the interaction between the number of legacy admits and the quality of the student body.

In the next section, we show that this second model—where the quality of the student body and the number of legacy admits are complements—best matches the empirical patterns in the data. As N_n rises, the gap between the admissions cutoffs c_n and c_l expands. In the data this will manifest as an increasing admissions advantage for LA applicants over time. Note that this does not imply that Harvard's admissions preferences are changing, simply that the marginal gain from an additional LA applicant is rising.

As discussed in the introduction, an alternative model that would also fit the data is one where Harvard is constrained to keep the number of athlete and legacy admits fixed over time. In the short run, it is reasonable to believe that a fixed number of recruited athletes need to be admitted to maintain current varsity sport offerings. Harvard consistently offered 40 varsity sports in the admissions cycles for the Classes of 2000–2017. However, over an almost 20-year period Harvard could have reduced the number of varsity sports offered if it desired. Thus, it is difficult to motivate why a constraint on LA admits would exist in the long run, and as a result we prefer the model allowing for complementarity in admit quality and the number of legacy and athlete admits.

The question is why student quality and the number of legacy admits would be complementary. If Harvard is interested in maximizing the intellectual output of its students, then both features of the admitted class are important. Boosting the number of legacy admits enhances Harvard's ability to raise funds for investments in physical capital and human capital in the form of faculty.[13]

A second possibility is related to the demand side of the elite college market. According to Jacob, McCall, and Stange (2018), high ability, high wealth students demand both academic quality and consumption amenities. One aspect of academic quality is peer quality, while consumption amenities can be purchased more easily with increased donations stemming from additional legacy admits. Athlete admits also fit into this framework since they generate a consumption amenity for other students.

3 Aggregate Trends in Harvard Admissions

Our theoretical model provides a lens through which we can examine changes in Harvard admissions over time. In this section, we describe how application shares and admission rates for special status applicants have changed over an 18-year period. For the analysis,

[13] For evidence regarding the link between legacy admissions and giving, see Meer and Rosen (2009, 2010).

we rely primarily on Trial Exhibit DX 042. This document lists the number of LA and NLNA applicants, admits, and matriculants by race/ethnicity for the Classes of 2000–2017. We supplement the aggregate admissions data with other documents introduced as evidence (and unsealed) as part of the *SFFA v. Harvard* trial. All documents we cite are publicly available either at the URL in the bibliography, or on the Public Access to Court Electronic Records (PACER) website at `https://www.pacer.gov/`.

3.1 Applications

The aggregate admissions data reported in Trial Exhibit DX 042 reveal tremendous increases in the number of domestic applicants to Harvard over this time period. However, most of the growth in applications has occurred for non-legacy and non-athlete (NLNA) applicants. Figure 1 shows the growth in domestic applicants relative to the Class of 2000 separately for NLNA applicants and legacy and recruited athlete (LA) applicants.[14] Over this period, the number of domestic NLNA applicants increased from 14,841 to 27,512, a rise of over 85%. In contrast, domestic LA applicants increased from 989 to 1,094, a boost of only 11%. The data reported in Trial Exhibit DX 042 do not allow for separate analysis of athlete and legacy applications. However, Document 415-9 indicates that for the Harvard Classes of 2014–2019, legacy applicants outnumbered athlete applicants by approximately three to one. Note that the categories are not mutually exclusive as a legacy can also be a recruited athlete.

An open question is why the number of applications to Harvard increased over this time period. While Harvard made changes to its own admissions and financial aid policies,[15] looking beyond Harvard it is clear that other elite colleges and universities experienced similar growth. In Appendix Figure B1, we graph the number of applications (Panel (a)) and the growth in applications (Panel (b)) for Harvard and other elite institutions.[16] The overall

[14] Appendix Table B1 provides the raw application, admit, and matriculant numbers for domestic NLNA and LA applicants by Harvard graduating class.

[15] First, Harvard eliminated (Class of 2012) and then restored (Class of 2016) their early action admissions program (see Trial Exhibit DX 728; Finder and Arenson, 2006; and Lewin, 2011). Second, Harvard pursued financial aid reforms over this time period, including an affordability initiative for the Class of 2012 (see The Harvard Gazette, 2007; Trial Exhibit DX 728).

[16] Elite institutions are 4-year public and private universities that have a 75th percentile math SAT score greater than or equal to 750 between the years of 2001 and 2017 in IPEDS. We drop any school missing more than one year of SAT scores or missing application totals. In Appendix Figure B2, we report similar

trends in applications are very similar, with both Harvard and other elite schools seeing their application totals rise by over 100% between the Classes of 2005 and 2021. There are a number of factors that could be driving these broader trends, including: (1) an expanding set of high school graduates; (2) increases in the number of applications conditional on applying to college; and (3) increases in the share of high school graduates that apply.[17]

Interestingly, none of the above explanations for the rise in applications to Harvard is likely to boost LA applications. First, there is simply a smaller population of potential legacy and recruited athlete applicants, making it difficult to expand this group further. Second, legacy and recruited athlete applicants at Harvard tend to come from highly advantaged families.[18] Historically, these applicants applied to and attended 4-year schools regardless of ability, leaving little scope for additional applications (Belley and Lochner, 2007).

3.2 Admissions

With the growth rate of NLNA applications far surpassing the growth rate of LA applications, the share of applications submitted by legacies and recruited athletes is falling over time. This is reflected in Figure 2(a). The dashed lines show the share of domestic applicants that are legacies and athletes, along with the corresponding linear prediction. The share of domestic applicants who are legacies or athletes fell from a high of over 7% in 2001 to a low of under 4% in 2015. More surprising is the pattern for admits shown in the solid lines. While the data is noisy, there is no time trend in the share of domestic admits that are legacies or athletes.[19] The share of admits that are legacies or recruited athletes is consistently over 21% during this time period. In 2017, the last year of the aggregate data, there were 488 LA admits and 1,094 LA applicants out of a total of 1,837 domestic admits and 28,606 domestic applicants.[20] Thus, 26.6% of admits were legacies and athletes despite being only 3.8% of

numbers for Ivy League colleges only.

[17] Bound, Hershbein, and Long (2009) examine long-run trends in application behavior from the 1970s to the 2000s.

[18] See Arcidiacono, Kinsler, and Ransom (2019b) for additional details.

[19] Adding international applicants and admits leads to a less than one percentage point decline in the LA share of admits over time. Between the Classes of 2000 and 2017, the number of international applicants tripled. We focus on domestic applicants to avoid navigating how the rise in international applicants changes the quality of the NLNA pool.

[20] See Appendix Table B1 for the raw numbers of domestic admits in each year.

the applicant pool.

With legacies and athletes becoming a substantially smaller share of the applicant pool and their share of admits showing no time trend, it must the be the case that the LA admit rate relative to the NLNA admit rate has grown. Figure 2(b) shows the ratio of the domestic LA admit rate to the admit rate for domestic NLNA applicants.[21] For the Class of 2000, legacies and athletes were admitted at a rate of 41%, while NLNA applicants were admitted at a rate of 10%, a ratio of approximately four to one. This ratio has increased dramatically over time, and by the end of the sample period the admit rate for legacies and athletes was over nine times that of NLNA applicants. For the Class of 2017, the admit rate for domestic LA applicants was 45%, while the admit rate for domestic NLNA applicants was only 5%. The growing admissions advantage for LA applicants is consistent with an admissions model where student quality and the number of legacy admits are complements.

4 Increased Preferences and Strength of the Applicant Pool

In our theoretical framework, we assume that the distribution of applicant quality is fixed as the number of NLNA applicants expands. However, if the additional NLNA applicants are generally of a lower quality, then the overall strength of the NLNA pool will weaken relative to the LA applicant pool. The admit rate ratio between LA and NLNA applicants would then rise, but not as the result of increasing admissions advantages. In this section we provide additional evidence that the rising admit rate ratio is more consistent with enhanced admissions advantages than compositional changes in the applicant pool.

4.1 Matriculations

A simple way to illustrate that the rising admit rate ratio between LA and NLNA applicants is the result of an increasing admissions advantage for LA applicants is to examine matriculation rates. If we assume that Harvard values academics and other activities similarly to

[21] The time pattern in the admit rate ratio is unchanged if we include international applicants.

other colleges and universities, an increase in admissions advantages for LA applicants should imply worse outside options for those who are admitted. With relatively worse alternative schools in their choice set, the matriculation rates for LA admits should increase.

Figure 3 shows that the matriculation rate for domestic legacies and athletes has grown substantially over this period. Indeed, the share of admitted legacies and athletes who turned down an offer of admission from Harvard fell from 21% to 10%, or by roughly half.[22] This stands in stark contrast to the matriculation rates for domestic NLNA admits. The matriculation rate for NLNA admits was 78% in the Class of 2000 and 77% in the Class of 2017, meaning that the profile for this group is flat or slightly decreasing.[23] To the extent that changes in matriculation rates over time reflect changes in outside options relative to the option to attend Harvard, it would appear as though the outside options for legacies and athletes have gotten relatively worse over time.

The matriculation patterns for NLNA and LA admits over time are consistent with the model presented in Section 2. When admit quality and legacy admits are complements, an increase in NLNA applicants will result in the admissions threshold for NLNA applicants rising while the threshold for LA applicants may fall. NLNA admit quality will be higher when the threshold rises, implying better outside options and a decline in the matriculation rate. The increasing competitiveness of the elite college market will tend to dampen the drop in matriculation rates since all schools are becoming more competitive. But if the market for college admissions as a whole has become more competitive while the admissions threshold for legacies and athletes at Harvard has been held fixed, legacies and athletes would be expected to have worse outside options and therefore higher matriculation rates over time.

4.2 Applicant Academic Strength over Time

In addition to matriculation rates, there is also direct evidence that the strength of NLNA applicants has not diminished as the pool of NLNA applicants expanded. Covering the same

[22]Raw matriculant totals for LA and NLNA applicant groups are presented in Appendix Table B1. Note that since the share of admits who are LA is flat, this implies that the share of matriculants who are LA is rising over time. The linear trend is positive and statistically significant. Adding international admits still results in a positive trend but it is no longer statistically significant.

[23]The dip for the Classes of 2012–2015 coincides with Harvard eliminating early action for these admissions cycles (see Trial Exhibit DX 728).

time period, Document 415-8 shows that average SAT scores have been rising.[24] But we can go further than just mean SAT scores using Trial Exhibit P044 which shows the distribution of Harvard applicants across SAT score bins for the Classes of 2009–2016. Although these classes are a subset of the classes we studied in the previous section, they cover the period of greatest NLNA applicant growth. While we cannot separate the SAT scores of LA and NLNA applicants, any time trends in the SAT scores are likely driven by NLNA applicants. Between the Classes of 2009 and 2016, NLNA applications grew from 18,377 to 26,861, while the number of LA applicants only grew from 1,034 to 1,114.[25]

Panel (a) of Figure 4 shows that the distribution of SAT math scores shifted slightly among applicants for the 2009 through 2016 classes. The share of applicants obtaining a math SAT score between a 650 and 740 dropped from approximately 46% to 39%, while there are minor increases in the shares of students scoring above a 740 and below a 650. These shifts in the SAT test score distribution occur prior to the Class of 2012, or before the significant jump in NLNA applications. In separate work (Arcidiacono, Kinsler, and Ransom, 2019c), we provide evidence that Harvard expanded its financial aid offerings and outreach efforts starting with the Class of 2008. As a result, the increasing share of applicants at the bottom of the SAT test score distribution between the Classes of 2009 and 2012 is likely related to Harvard's enhanced recruitment of under represented minority (URM) and low-income students.

To illustrate that this change in the applicant pool is not the primary force driving the change in the admit rate ratio between LA and NLNA applicants, we re-examine the patterns in SAT scores, applications, and admits focusing only on non-URM applicants. Panel (b) of Figure 4 shows that among non-URM applicants there has actually been a slight strengthening of the applicant pool. Panel (a) of Figure 5 shows that among non-URM applicants, the LA share of admits is flat while the LA share of applicants is falling, mimicking the pattern among all applicants and admits. Finally, Panel (b) of Figure 5 shows that the ratio of the LA to NLNA admit rate among non-URM applicants increased from 4.5 in 2000 to almost 9.5 in 2017. Thus, the LA admissions advantage appears to have

[24] The one exception is for African Americans. See Arcidiacono, Kinsler, and Ransom (2019c) for an analysis of African American applications over time.

[25] Raw applicant totals for LA and NLNA applicant groups are presented in Appendix Table B1.

expanded among non-URM applicants, while the quality of these applicants, as measured by SAT scores, has strengthened.

4.3 Auxiliary Evidence

Additional information in the public record also suggests that a change in the composition of the NLNA pool is not the primary explanation for the growing admissions advantage experienced by LA applicants. An Office for Civil Rights report on Harvard admissions (Trial Exhibit P555) indicates that for the Classes of 1985–1992, the average legacy admit rate was 35.7%. For legacy applicants to the Classes of 2014–2019, the average admit rate was 33.6% (Arcidiacono, Kinsler, and Ransom, 2019b).[26] At the same time, the overall admit rate (including LA applicants) dropped from 16.9% for the Classes of 1985–1992 to less than 8% for the Classes of 2014–2019. We can establish that for most of this period (2000–2017), the average SAT score among applicants increased (Trial Exhibit DX 042), and the previous section illustrates that the distribution of applicant SAT scores was mostly unchanged for the Classes of 2009–2016. In light of the SAT score patterns and the growing NLNA applicant pool, the constancy of the legacy admit rate is remarkable. It suggests that Harvard did not adjust the admissions threshold for LA applicants, but increased the threshold for NLNA applicants as the NLNA applicant pool expanded. While this is consistent with NLNA and LA admits being complements in Harvard's objective function, an alternative explanation is that LA applicants have become stronger relative to NLNA applicants.

The idea that LA applicants have become significantly stronger than NLNA applicants over time is not only contradicted by the matriculation patterns discussed previously, but also by admissions data for the Classes of 2014–2019. Table 2 of (Arcidiacono, Kinsler, and Ransom, 2019b) indicates that there are nearly twenty NLNA applicants for every LA applicant with the two highest academic ratings.[27] If Harvard had filled their admit class by

[26] There is a significant increase over time in recruited athlete admit rates, from approximately 50% in the late 1980s to over 80% currently. This increase coincides with a decline in the number of recruited athlete applicants, suggesting a change in recruiting which may contribute to the patterns in Figures 2 and 5. However, if a change in recruiting practices were the principal factor driving the LA patterns, we should observe fewer LA applicants and higher LA admit rates over time. Appendix Table B1 indicates the opposite is true, suggesting that changes in athletic recruiting practices are unlikely to explain the increasing LA admissions advantages.

[27] Due to data constraints, here and in the rest of this paragraph we are grouping applicants on the dean's

drawing randomly from the top two academic ratings groups, the admitted class would have been 5.5% LA, whereas for the Class of 2017 the actual share was over 26%. Moreover, in the bottom two academic rating groups, nearly 90% of the admits are recruited athletes. If the LA pool of applicants were vastly superior to the NLNA pool of applicants, there would be little reason to admit recruited athletes with such poor academic credentials. While we cannot entirely rule out that there have been minor changes in the relative strength of LA and NLNA applicants over time, any changes would likely explain only a small share of the more than doubling of the LA admissions advantage.

5 Conclusion

Admissions to elite colleges and universities have become increasingly competitive. At Harvard, admit rates are now less than 5%. Yet, some groups have been relatively immune from these competitive forces. Despite representing an increasingly smaller share of the applicant pool, the share of Harvard admits who are legacies or athletes has been remarkably stable over time. Over the course of the 18 years we analyze, legacies and athletes moved from being four times more likely to be admitted as their non-legacy, non-athlete counterparts to nine times more likely to be admitted. Given the accompanying rise in applicant test scores and the increase in legacy and athlete matriculation rates, the evidence strongly suggests that the admissions advantages legacies and athletes have at Harvard are growing. This growth can be explained by a model of admissions where the quality of the student body and the number of legacies and athletes are complements in the university's objective function.

The increasing admissions advantage for legacies and athletes at Harvard is in part the result of enormous growth in NLNA applications of constant quality with no commensurate increase in available seats.[28] One approach to lessen these advantages would be to expand enrollment. A number of economists have advocated for this, claiming that a reduction

interest list (primarily relatives of donors) and children of faculty and staff with legacy and athlete applicants. Thus, we are actually understating the relative ratio.

[28] Indeed, as shown in Arcidiacono, Kinsler, and Ransom (2019a), increased competition from international applicants has resulted in a decrease in the number of domestic admits. Arcidiacono, Kinsler, and Ransom (2019a) also shows the negative implications on minorities from increased preferences for legacies and athletes.

in applicant competition would reduce tensions around legacy and athlete admissions.[29] However, as Blair and Smetters (2018) suggest, institutional prestige is one reason why Harvard and other elite colleges are reluctant to expand. As a result, the controversy over legacy and athlete admissions will likely continue unless significant changes are made to admissions policies.

[29] See Cowen (2018), Smith (2018) and Wermund (2018) for examples.

References

Anderson, Greta. 2020. "A Winning Plan and a Major Letdown." *Inside Higher Ed* URL https://www.insidehighered.com/news/2020/06/01/brown-university-cuts-11-varsity-sports. Accessed June 5, 2020.

Arcidiacono, Peter, Esteban Aucejo, Hanming Fang, and Kenneth I. Spenner. 2011. "Does affirmative action lead to mismatch? A new test and evidence." *Quantitative Economics* 2:303–333.

Arcidiacono, Peter, Josh Kinsler, and Tyler Ransom. 2019a. "Divergent: The Time Path of Legacy and Athlete Admissions at Harvard." Working Paper 26315, National Bureau of Economic Research.

———. 2019b. "Legacy and Athlete Preferences at Harvard." Working paper, Duke University.

———. 2019c. "Recruit to Reject: Implications of Harvard's Recruitment Efforts." Working paper, Duke University.

Belley, Philippe and Lance Lochner. 2007. "The Changing Role of Family Income and Ability in Determining Educational Achievement." *Journal of Human Capital* 1 (1):37–89.

Blair, Peter and Kent Smetters. 2018. "Why Don't Elite Colleges Expand Supply?" Working Paper.

Bound, John, Brad Hershbein, and Bridget Terry Long. 2009. "Playing the Admissions Game: Student Reactions to Increasing College Competition." *Journal of Economic Perspectives* 23 (4):119–146.

Bowen, William G. and Sarah A. Levin. 2003. *Reclaiming the Game: College Sports and Educational Values*. Princeton, New Jersey: Princeton University Press.

Caldera, Camille G. and Sahar M. Mohammadzadeh. 2019. "Record-Low 4.5 Percent of Harvard College Applicants Accepted to Class of 2023." *The Harvard Crimson* URL https://www.thecrimson.com/article/2019/3/29/2023-admit-numbers/. Accessed June 25, 2019.

Chade, Hector, Gregory Lewis, and Lones Smith. 2014. "Student Portfolios and the College Admissions Problem." *Review of Economic Studies* 81:971–1002.

Chappell, Bill and Merrit Kennedy. 2019. "U.S. Charges Dozens Of Parents, Coaches In Massive College Admissions Scandal." *NPR* URL https://www.npr.org/2019/03/12/702539140/u-s-accuses-actresses-others-of-fraud-in-wide-college-admissions-scandal. Accessed March 23, 2019.

Cowen, Tyler. 2017. "Legacy Students Make Harvard's Finances Work." *Bloomberg* URL https://www.bloombergquint.com/view/legacy-students-make-harvard-s-finances-work. Accessed April 26, 2019.

———. 2018. “Let Harvard Be Harvard, Only Bigger.” *Bloomberg* URL https://www.bloomberg.com/opinion/articles/2018-11-01/let-harvard-be-harvard-only-bigger. Accessed August 2, 2019.

Desai, Saahil. 2018. “College Sports are Affirmative Action for Rich White Students.” *The Atlantic* URL https://www.theatlantic.com/education/archive/2018/10/college-sports-benefits-white-students/573688/. Accessed June 25, 2019.

Document 415-8. 2017. In *Students for Fair Admissions, Inc. v. President and Fellows of Harvard College et al.* Civil Action No. 14-14176-ADB (D. Mass). URL https://docs.justia.com/cases/federal/district-courts/massachusetts/madce/1:2014cv14176/165519/415/1.html. Plaintiff Expert Witness Opening Report.

Document 415-9. 2018. In *Students for Fair Admissions, Inc. v. President and Fellows of Harvard College et al.* Civil Action No. 14-14176-ADB (D. Mass). URL https://docs.justia.com/cases/federal/district-courts/massachusetts/madce/1:2014cv14176/165519/415/2.html. Plaintiff Expert Witness Rebuttal Report.

Epple, Dennis, Richard Romano, and Holger Sieg. 2006. “Admission, Tuition, and Financial Aid Policies in the Market for Higher Education.” *Econometrica* 74 (4):885–928.

Espenshade, Thomas J., Chang Y. Chung, and Joan L. Walling. 2004. “Admission Preferences for Minority Students, Athletes, and Legacies at Elite Universities.” *Social Science Quarterly* 85 (5):1422–1446.

Finder, Alan and Karen W. Arenson. 2006. “Harvard Ends Early Admission.” *The New York Times* URL https://www.nytimes.com/2006/09/12/education/12harvard.html. Accessed May 29, 2019.

Fu, Chao. 2014. “Equilibrium Tuition, Applications, Admissions, and Enrollment in the College Market.” *Journal of Political Economy* 122 (2):225–281.

Golden, Daniel. 2006. *The Price of Admission: How America’s Ruling Class Buys Its Way into Elite Colleges – and Who Gets Left Outside the Gates*. New York: Crown Publishers.

Hurwitz, Michael. 2011. “The Impact of Legacy Status on Undergraduate Admissions at Elite Colleges and Universities.” *Economics of Education Review* 30 (3):480–492.

Jacob, Brian, Brian McCall, and Kevin Stange. 2018. “College as Country Club: Do Colleges Cater to Students’ Preferences for Consumption?” *Journal of Labor Economics* 36 (2):309–348.

Kapor, Adam. 2020. “Distributional Effects of Race-Blind Affirmative Action.” Working Paper.

Karabel, Jerome. 2005. *The Chosen: The Hidden History of Admission and Exclusion at Harvard, Yale, and Princeton*. New York: Houghton Mifflin.

Lamb, John D. 1993. "The Real Affirmative Action Babies: Legacy Preference at Harvard and Yale." *Columbia Journal of Law and Social Problems* 26 (3):491–521.

Lewin, Tamar. 2011. "Harvard and Princeton Restore Early Admission." *The New York Times* URL https://www.nytimes.com/2011/02/25/education/25admissions.html. Accessed May 29, 2019.

Meer, Jonathan and Harvey S. Rosen. 2009. "Altruism and the Child Cycle of Alumni Donations." *American Economic Journal: Economic Policy* 1 (1):258–286.

———. 2010. "Family Bonding with Universities." *Research in Higher Education* 51 (7):641–658.

Rothschild, Michael and Lawrence J. White. 1996. "The Analytics of the Pricing of Higher Education and Other Services in Which the Customers Are Inputs." *Journal of Political Economy* 103 (3):573–586.

Smith, Noah. 2018. "Harvard Doing America's Best Students No Favors." *Bloomberg* URL https://www.bloomberg.com/opinion/articles/2018-06-28/harvard-and-top-private-schools-should-increase-admissions-a-lot. Accessed June 25, 2019.

The Harvard Gazette. 2007. "Harvard Announces Sweeping Middle-income Initiative." *The Harvard Gazette* URL https://news.harvard.edu/gazette/story/2007/12/harvard-announces-sweeping-middle-income-initiative/. Accessed May 29, 2019.

Trial Exhibit DX 042. 2018. In *Students for Fair Admissions, Inc. v. President and Fellows of Harvard College et al.* Civil Action No. 14-14176-ADB (D. Mass). URL https://github.com/tyleransom/SFFAvHarvard-Docs/blob/master/TrialExhibits/D042.pdf. Demographic Breakdown of Applicants, Admits, and Matriculants.

Trial Exhibit DX 728. 2018. In *Students for Fair Admissions, Inc. v. President and Fellows of Harvard College et al.* Civil Action No. 14-14176-ADB (D. Mass). URL https://github.com/tyleransom/SFFAvHarvard-Docs/blob/master/TrialExhibits/D728.pdf. Share of applicants by race before and after changes to early admission policy.

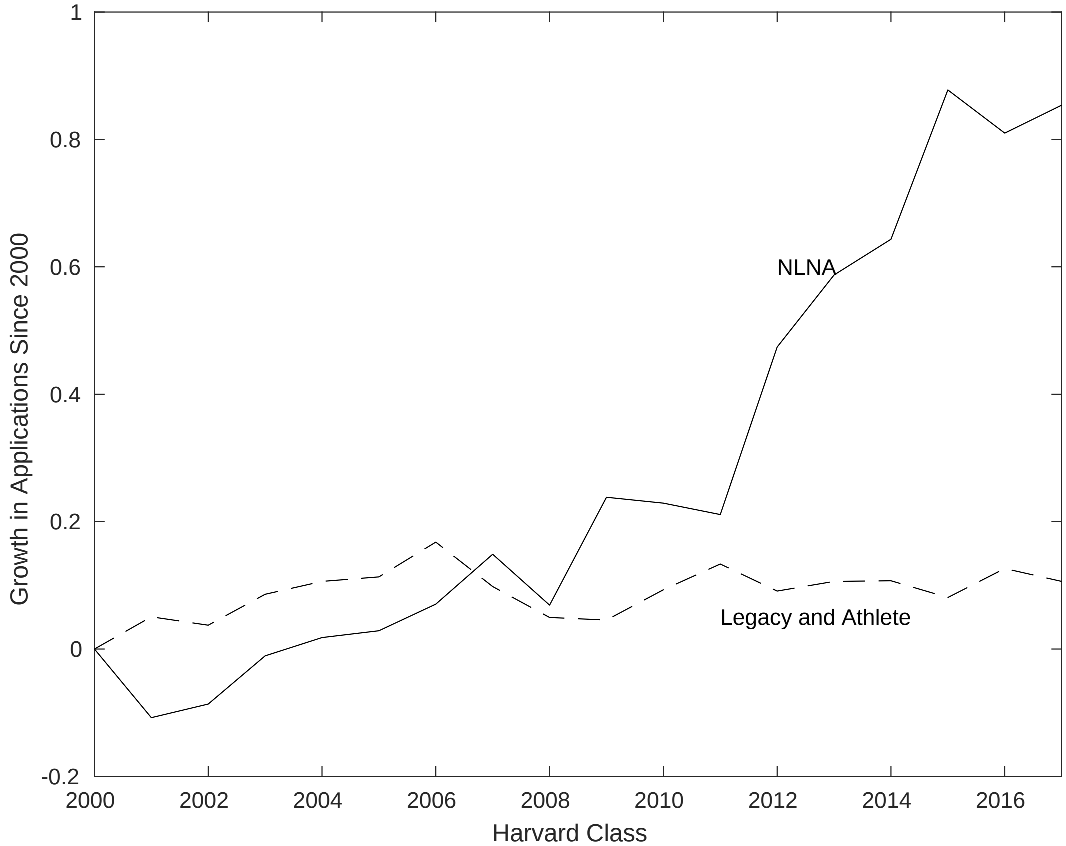
Trial Exhibit P044. 2018. In *Students for Fair Admissions, Inc. v. President and Fellows of Harvard College et al.* Civil Action No. 14-14176-ADB (D. Mass). URL https://github.com/tyleransom/SFFAvHarvard-Docs/blob/master/TrialExhibits/P044.pdf. SAT Distributions by Race and Applicant/Admit Status for Classes of 2009–2014.

Trial Exhibit P555. 2018. In *Students for Fair Admissions, Inc. v. President and Fellows of Harvard College et al.* Civil Action No. 14-14176-ADB (D. Mass). URL https://github.com/tyleransom/SFFAvHarvard-Docs/blob/master/TrialExhibits/P555.pdf. Office of Civil Rights Report.

Wermund, Benjamin. 2018. "Should Harvard double its enrollment?" *Politico* URL https://www.politico.com/newsletters/morning-education/2018/06/19/should-harvard-double-its-enrollment-258181. Accessed June 26, 2019.

Figures and Tables

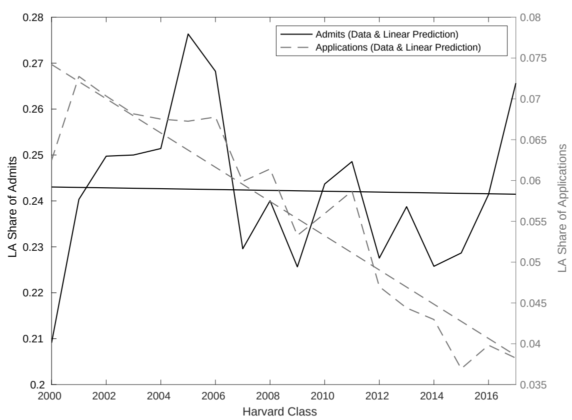
Figure 1: Growth in LA and NLNA Applications, Classes of 2000–2017



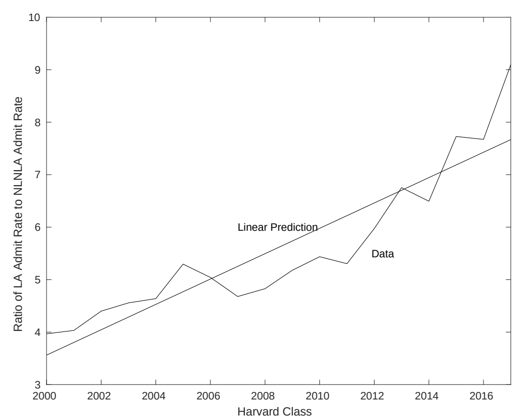
Note: Includes only domestic applicants. Growth is defined as the number of applications in a given year minus the number of applications in the Class of 2000, all divided by the number of applications in the Class of 2000.
Source: Authors' calculations from *SFFA v. Harvard* Trial Exhibit DX 042.

Figure 2: Trends in LA Composition and Admissions Rates

(a) Share of Applicants and Admits who are LA



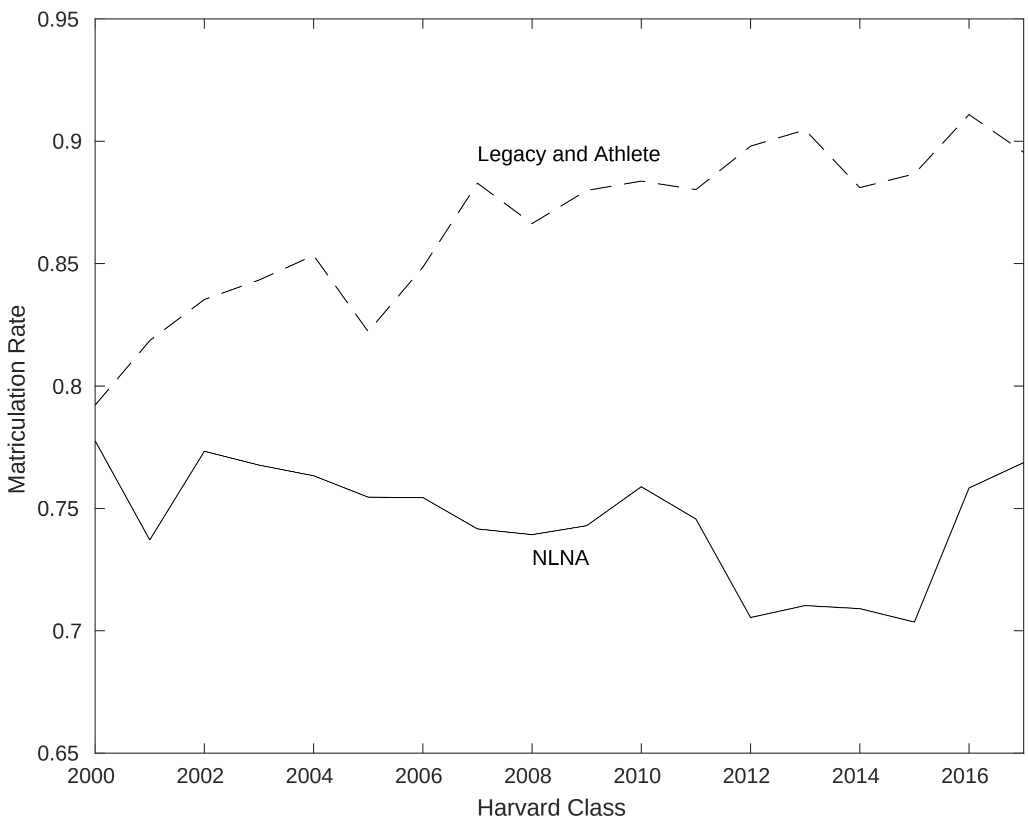
(b) Ratio of LA Admit Rates to NLNA Admit Rates



Note: Domestic applicants only.

Source: Authors' calculations from *SFFA v. Harvard* Trial Exhibit DX 042.

Figure 3: Trends in Matriculation by LA and NLNA

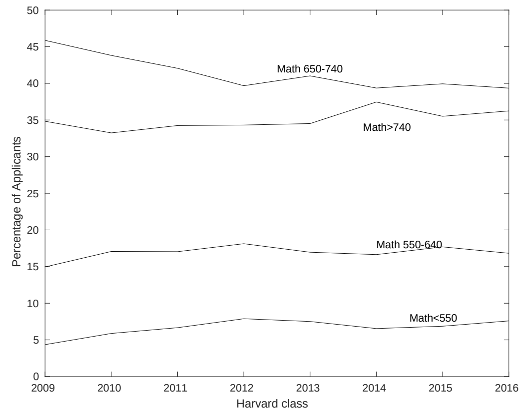


Note: Includes domestic applicants only.

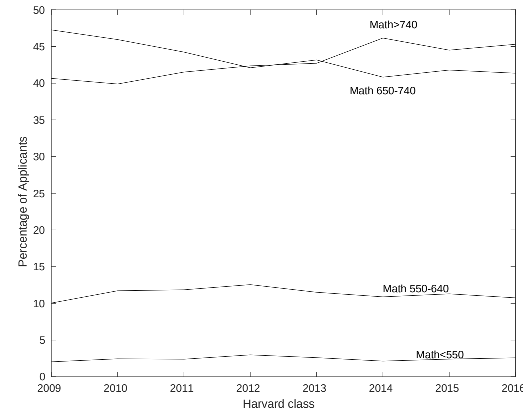
Source: Authors' calculations from *SFFA v. Harvard* Trial Exhibit DX 042.

Figure 4: Domestic Applicant SAT Test Score Distribution, Classes of 2009–2016

(a) All Domestic Applicants



(b) Non-URM Domestic Applicants

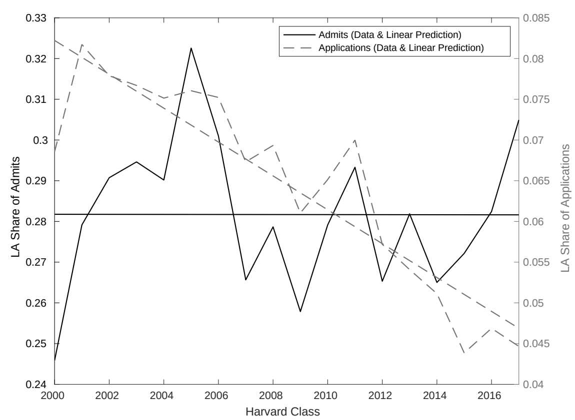


Note: Domestic applicants only.

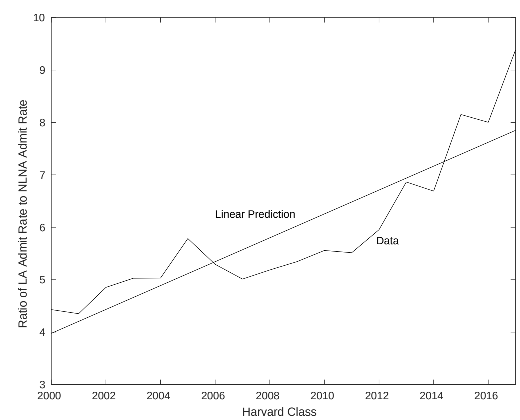
Source: Authors' calculations from *SFFA v. Harvard* Trial Exhibit DX 042.

Figure 5: Non-URM Trends in LA Composition and Admissions Rates

(a) Share of Applicants and Admits who are LA



(b) Ratio of LA Admit Rates to NLNA Admit Rates



Note: Domestic, non-URM applicants only.

Source: Authors' calculations from *SFFA v. Harvard* Trial Exhibit DX 042.

A Proofs of Theorems

This appendix contains proofs for the two theorems included in the text.

A.1 Proof of Theorem 1

When the objective function of the university is

$$\max_{c_l, c_n} N_l \int_{c_l} x\phi_l(x)dx + N_n \int_{c_n} x\phi_n(x)dx + h\left(N_l\left[1 - \Phi_l(c_l)\right]\right)$$
$$\text{s.t. } N_l(1 - \Phi_l(c_l)) + N_n(1 - \Phi_n(c_n)) = \overline{N}$$

with $h(\cdot) > 0, h'(\cdot) > 0, h''(\cdot) < 0$, the first-order conditions of the Lagrangian are

$$-N_l c_l \phi_l(c_l) - h'(\cdot)N_l\phi_l(c_l) - \lambda N_l \phi_l(c_l) = 0$$
$$-N_n c_n \phi_n(c_n) - \lambda N_n \phi_n(c_n) = 0$$
$$\overline{N} - N_l(1 - \Phi_l(c_l)) - N_n(1 - \Phi_n(c_n)) = 0$$

Using the first two equations it is straightforward to see that $c_n = c_l + h'(\cdot)$, or that the cutoff is lower for legacies.

Using this result, we can write the final first-order condition as

$$\overline{N} - N_l(1 - \Phi_l(c_l)) - N_n(1 - \Phi_n(c_l + h'(\cdot))) = 0.$$

We can take the derivative of both sides with respect to N_n, exploiting the fact that c_l is an implicit function of N_n, and recover

$$\frac{\partial c_l}{\partial N_n} = \frac{1 - \Phi_n(c_l + h'(\cdot))}{N_l\phi_l(c_l) + N_n\phi_n\left(c_l + h'(\cdot)\right)\left[-h''(\cdot)N_l\phi_l(c_l)\right]} > 0$$

since $h''(\cdot) < 0$ and all other terms in the expression are positive.

If the cutoff rises, the number of legacy admits will fall, so an increase in N_n will result in a decrease in the number of legacy admits.

A.2 Proof of Theorem 2

When the objective function of the university is

$$\max_{c_l, c_n} \left(N_l \int_{c_l} x\phi_l(x)dx + N_n \int_{c_n} x\phi_n(x)dx \right) h\left(N_l[1 - \Phi_l(c_l)]\right)$$
$$\text{s.t. } N_l(1 - \Phi_l(c_l)) + N_n(1 - \Phi_n(c_n)) = \overline{N}$$

with $h(\cdot) > 0, h'(\cdot) > 0, h''(\cdot) < 0$, the first-order conditions of the Lagrangian are

$$-N_l c_l \phi_l(c_l)h(\cdot) - h'(\cdot)(N_l\phi_l(c_l)) \left(N_l \int_{c_l} x\phi_l(x)dx + N_n \int_{c_n} x\phi_n(x)dx \right) - \lambda N_l \phi_l(c_l) = 0$$
$$-N_n c_n \phi_n(c_n)h(\cdot) - \lambda N_n \phi_n(c_n) = 0$$
$$\overline{N} - N_l(1 - \Phi_l(c_l)) - N_n(1 - \Phi_n(c_n)) = 0$$

Using the first two equations, we can relate c_l and c_n according to,

$$c_n - c_l = \frac{h'(\cdot)\left(N_l \int_{c_l} x\phi_l(x)dx + N_n \int_{c_n} x\phi_n(x)dx \right)}{h(\cdot)}.$$

Combined with the capacity constraint, this give us two equations in two unknowns. We can rewrite each equation as implicit functions $f(\cdot)$ and $g(\cdot)$, where N_n and N_l are exogenous arguments and c_n and c_l are endogenous arguments:[30]

$$\begin{aligned} f\left(c_l(N_n, N_l), c_n(N_n, N_l), N_n, N_l\right) &= (c_l - c_n)h(N_l(1 - \Phi_l(c_l))) \\ &\quad + h'(\cdot)\left(N_l \int_{c_l} x\phi_l(x)dx + N_n \int_{c_n} x\phi_n(x)dx \right) = 0 \end{aligned}$$

and

$$g\left(c_l(N_n, N_l), c_n(N_n, N_l), N_n, N_l\right) = \overline{N} - N_l(1 - \Phi_l(c_l)) - N_n(1 - \Phi_n(c_n)) = 0$$

[30] Recall that $\overline{N}$ is assumed to be fixed.

Using the Implicit Function Theorem, we can show that

$$\frac{\partial c_l}{\partial N_n} = \frac{f'_{c_n} g'_{N_n} - g'_{c_n} f'_{N_n}}{f'_{c_l} g'_{c_n} - g'_{c_l} f'_{c_n}}$$

where

$$\begin{aligned}
f'_{c_n} &= -h'(\cdot) N_n c_n \phi_n(c_n) - h(\cdot) \\
g'_{N_n} &= -(1 - \Phi_n(c_n)) \\
g'_{c_n} &= N_n \phi_n(c_n) \\
f'_{N_n} &= h'(\cdot) \int_{c_n} x \phi_n(x) dx \\
f'_{c_l} &= h(\cdot) - h''(\cdot) N_l \phi_l(c_l) \left(N_l \int_{c_l} x \phi_l(x) dx + N_n \int_{c_n} x \phi_n(x) dx \right) - N_l \phi_l(c_l)(h'(\cdot)(2c_l - c_n)) \\
g'_{c_l} &= N_l \phi_l(c_l)
\end{aligned}$$

The denominator is:

$$\left[h(\cdot) - h''(\cdot) N_l \phi_l(c_l) \left(N_l \int_{c_l} x \phi_l(x) dx + N_n \int_{c_n} x \phi_n(x) dx \right) - N_l \phi_l(c_l)(h'(\cdot)(2c_l - c_n)) \right] N_n \phi_n(c_n) +$$
$$N_l \phi_l(c_l) \left[h'(\cdot) N_n c_n \phi_n(c_n) + h(\cdot) \right]$$

which can be rewritten as

$$\begin{aligned}
&N_n \phi_n(c_n) h(\cdot) + N_l \phi_l(c_l) h(\cdot) + 2 N_l \phi_l(c_l) N_n \phi_n(c_n)(h'(\cdot)(c_n - c_l)) - \\
&h''(\cdot) N_l \phi_l(c_l) N_n \phi_n(c_n) \left(N_l \int_{c_l} x \phi_l(x) dx + N_n \int_{c_n} x \phi_n(x) dx \right).
\end{aligned}$$

Since $c_n > c_l$, $h(\cdot) > 0$, $h'(\cdot) > 0$, and $h''(\cdot) < 0$, all the terms in the expression are positive, so the sign of denominator is positive.

Now consider the numerator:

$$\left[h'(\cdot) N_n c_n \phi_n(c_n) + h(\cdot) \right] \left[1 - \Phi_n(c_n) \right] - N_n \phi_n(c_n) h'(\cdot) \int_{c_n} x \phi_n(x) dx$$

which can be rewritten as:

$$h'(\cdot)N_n\phi_n(c_n)(1-\Phi_n(c_n))\left[c_n-\frac{\int_{c_n}x\phi_n(x)dx}{1-\Phi(c_n)}\right]+h(\cdot)(1-\Phi(c_n))$$

The term inside the brackets is negative: the expected value of x conditional on being above the cutoff has to be greater than the cutoff. $h'(\cdot)N_n\phi_n(c_n)(1-\Phi_n(c_n))$ and $h(\cdot)(1-\Phi(c_n))$ are both positive. Thus, $\frac{\partial c_l}{\partial N_n}\leq 0$ when

$$h(\cdot)\leq h'(\cdot)N_n\phi_n(c_n)\left[\frac{\int_{c_n}x\phi_n(x)dx}{1-\Phi(c_n)}-c_n\right].$$

We have used the fact that the Implicit Function Theorem (applied to our first order conditions) states that

$$\begin{bmatrix}\frac{\partial c_l}{\partial N_n}\\ \frac{\partial c_n}{\partial N_n}\end{bmatrix}=-\begin{bmatrix}f'_{c_l} & f'_{c_n}\\ g'_{c_l} & g'_{c_n}\end{bmatrix}^{-1}\begin{bmatrix}f'_{N_n}\\ g'_{N_n}\end{bmatrix}.$$

Using the fact that that the negative inverse of the square matrix is

$$-\begin{bmatrix}f'_{c_l} & f'_{c_n}\\ g'_{c_l} & g'_{c_n}\end{bmatrix}^{-1}=\frac{1}{f'_{c_l}g'_{c_n}-g'_{c_l}f'_{c_n}}\begin{bmatrix}-g'_{c_n} & f'_{c_n}\\ g'_{c_l} & -f'_{c_l}\end{bmatrix},$$

we have

$$\frac{\partial c_l}{\partial N_n}=\frac{f'_{c_n}g'_{N_n}-g'_{c_n}f'_{N_n}}{f'_{c_l}g'_{c_n}-g'_{c_l}f'_{c_n}},$$

as we claimed earlier in the proof.

B Supporting Figures and Tables

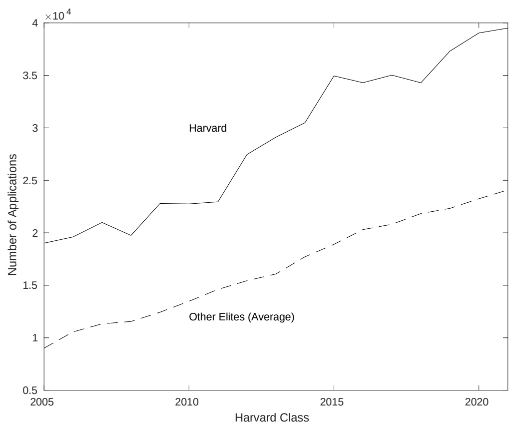
Table B1: Domestic Applicants, Admits, and Matriculants by Class

	Legacy and Athlete			Non-Legacy and Non-Athletes		
Year	Applicants	Admits	Matriculants	Applicants	Admits	Matriculants
2000	989	409	324	14,841	1,547	1,203
2001	1,039	485	397	13,242	1,533	1,130
2002	1,026	492	411	13,559	1,478	1,143
2003	1,074	485	409	14,682	1,455	1,117
2004	1,094	491	419	15,108	1,462	1,116
2005	1,101	540	444	15,267	1,414	1,067
2006	1,155	515	437	15,887	1,405	1,060
2007	1,086	444	392	17,049	1,490	1,105
2008	1,038	464	402	15,864	1,469	1,086
2009	1,034	433	381	18,377	1,486	1,104
2010	1,081	473	418	18,240	1,468	1,114
2011	1,121	476	419	17,974	1,439	1,073
2012	1,079	451	405	21,877	1,531	1,080
2013	1,094	472	427	23,556	1,505	1,069
2014	1,095	454	400	24,388	1,557	1,104
2015	1,069	450	399	27,867	1,518	1,068
2016	1,114	449	409	26,861	1,411	1,070
2017	1,094	488	437	27,512	1,349	1,037

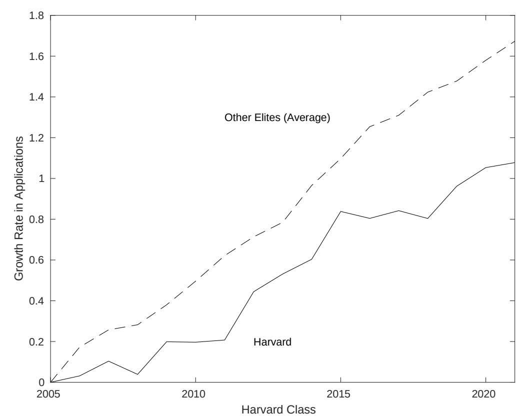
Note: Domestic applicants only.
Source: Authors' calculations from *SFFA v. Harvard* Trial Exhibit DX 042.

Figure B1: Application Trends at Harvard and Other Elites

(a) Total Applications



(b) Application Growth



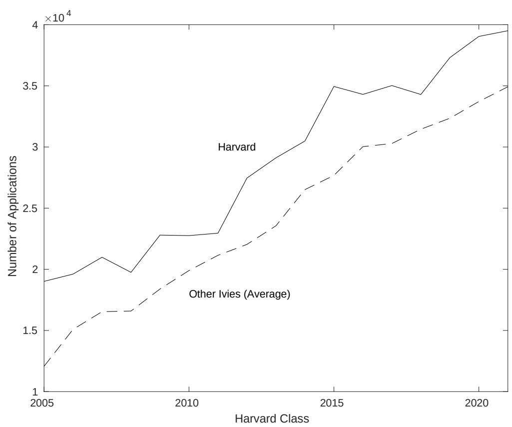
Notes: Panel (a) lists, by year, the total number of applications submitted to Harvard, compared to the total number of applications submitted to Other Elites divided by the number of Other Elite universities. Panel (b) lists growth rates based on the numbers presented in Panel (a).

Other Elites include the following: Amherst College, Caltech, Carnegie Mellon, Columbia, Cornell, Dartmouth, Duke, Harvey Mudd, Johns Hopkins, MIT, Northwestern, Pomona College, Princeton, Rice, Stanford, Swarthmore, Penn, Williams, and Yale. These were chosen because they are 4-year public and private universities that have a 75th percentile math SAT score greater than or equal to 750 between the years of 2001 and 2017, and because they are not missing more than one year of SAT scores or application totals.

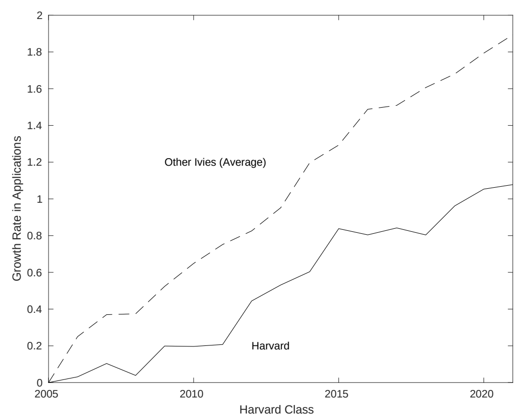
Source: Authors' calculations from *SFFA v. Harvard* Trial Exhibit DX 042 and US National Center for Education Statistics' Integrated Postsecondary Education Data System (IPEDS).

Figure B2: Application Trends at Harvard and Other Ivies

(a) Total Applications



(b) Application Growth



Notes: Panel (a) lists, by year, the total number of applications submitted to Harvard, compared to the total number of applications submitted to other Ivy League institutions divided by the number of other Ivies. Panel (b) lists growth rates based on the numbers presented in Panel (a).

Other Ivies include Columbia, Cornell, Dartmouth, Princeton, Penn, and Yale. Brown is excluded due to incomplete data.

Source: Authors' calculations from *SFFA v. Harvard* Trial Exhibit DX 042 and US National Center for Education Statistics' Integrated Postsecondary Education Data System (IPEDS).