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

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Abstract

We examine how increased admissions competition at elite US colleges has 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. These facts imply a strong degree of complementarity in the number of LA admits and overall admit quality. If the admissions advantages for LA applicants had been constant throughout this period, there would have been a large increase in the number of minority admits.

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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 also

[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.

be complementary if, for example, legacy admits boost fundraising and the productivity of institutional spending is increasing in student quality.[3] If the degree of complementarity is strong enough, the number of LA admits will remain steady or even increase as the number of NLNA applicants expands. 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, 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.[5]

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 (2021) 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. Using data only on non-URM applicants shows the same pattern of increasing LA advantages since URMs make up a relatively small share of the applicant pool. Second,

[3]See also Cowen (2017) for a more detailed discussion of this point in the popular press. Michelman, Price, and Zimmerman (2021) document a large monetary return to elite club membership at Harvard. They use historical data from Harvard to show that students with privileged backgrounds (akin to LA students in our study) are more likely to join elite clubs while at Harvard, which raises their lifetime incomes.

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

[5]The higher admit rates for LA applicants can reflect both preferences for these groups and differences in other applicant attributes. For a slightly broader set of specialized applicants (including also donor-connected and children of faculty/staff applicants, Arcidiacono, Kinsler, and Ransom (Forthcoming) shows that removing special applicant preferences reduces the admit rates for these groups by nearly 75%.

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 supporting our claim of increased 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 to Harvard over time.[6] 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.

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 is plausible given the need to fill the rosters of varsity sports. For the admissions cycles covered by the Classes of 2000–2017, the number of varsity sports offered by Harvard was fixed at 40.[7] 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.[8] However, for quotas to rationalize the data patterns, 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 quota for legacy admits, which is another reason why we prefer our model with complementary preferences. Regardless, 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

[6]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.

[7]See Appendix Table E1 of Arcidiacono, Kinsler, and Ransom (Forthcoming).

[8]For example, in the spring of 2020, Brown University announced a plan to reduce 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.

expanding NLNA applicant pool.

The levels and trends in LA applications and admits suggest that these groups receive a significant and growing admissions advantage at Harvard. Arcidiacono, Kinsler, and Ransom (Forthcoming) show that LA applicants are substantially more likely to be white and come from high income households.[9] We may expect that, at least with regard to race, there would be some catch-up for other minority groups over time. And indeed, the data show an increasing number of minority LA applicants and admits. However, the level of white LA applicants and admits remains an order of magnitude larger than for other racial groups. As a result, an increase in the LA admissions advantage will still tend to predominantly benefit white applicants. We show that the effect of this increased advantage over time more than offsets any gains minorities have received from their increased representation in the LA pool.

The favorable treatment that legacies and athletes receive in the admissions process at elite colleges is well documented.[10] 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).[11] 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.[12] Also using data revealed in *Students for Fair Admissions v. Harvard*, Arcidiacono, Kinsler, and Ransom (Forthcoming) show that legacy and athlete applicants for the Harvard classes of 2014–2019 received sizable admission preferences and that white and high-income applicants were the primary beneficiaries. Our paper complements Arcidiacono, Kinsler, and Ransom (Forthcoming) by showing that the current level of legacy and athlete preferences is significantly higher relative to what it was just a short time ago, consistent with either a quota for these groups or complementarities between the quality of the student body and the legacy and

[9] Arcidiacono, Kinsler, and Ransom (Forthcoming) show that over 16% of white admits are recruited athletes and over 20% of white admits are legacies. For all other racial groups, the *combined* shared of admits who are recruited athletes or legacies is less than 14%.

[10] 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 poor academic ratings in 1966 (pp. 289–90), a finding supported in more recent data by Arcidiacono, Kinsler, and Ransom (Forthcoming).

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

[12] See Espenshade, Chung, and Walling (2004) and Hurwitz (2011) as examples.

athlete share. We further demonstrate that the increases in the LA advantage over time work against racial diversity despite the growing presence of minorities in the LA applicant pool.

2 A Model of College Admissions

We begin by considering how changes in the applicant pool affect admissions decisions. 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—affect admissions decisions differently for LA and NLNA applicants. We use a simple model to describe the conditions under which an increase in the number of NLNA applicants would result in the number of LA admits going down, staying constant, or increasing.

We model the university as valuing two characteristics in its admitted class: student quality, $x \in \Re^+$, and whether the student is a legacy, $s \in \{l, n\}$.[13] For ease of exposition, throughout the model section we use the term legacy rather than legacy and athlete. 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.

The university is assumed to have convex preferences over student quality and total legacy admits and chooses these class attributes by solving the following constrained optimization

[13] 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.

problem

$$\max_{c_l, c_n} U(a,b) \text{ s.t. } N_l(1-\Phi_l(c_l)) + N_n(1-\Phi_n(c_n)) = \overline{N}$$

$$a := N_l \int_{c_l} x\phi_l(x)dx + N_n \int_{c_n} x\phi_n(x)dx \qquad \text{(student quality)}$$

$$b := N_l[1-\Phi_l(c_l)] \qquad \text{(total legacy admits)}$$

where $U(a,b) : \Re^2 \to \Re$ is continuous with $U'_z(\cdot) > 0$, $U''_z(\cdot) \leq 0$ for $z = a, b$. Using the first order conditions of the Lagrangian with respect to c_l and c_n gives us a relationship between these two cutoffs and the marginal utilities of student quality and legacy admits:[14]

$$c_n - c_l = \frac{\partial U}{\partial b}\left(\frac{\partial U}{\partial a}\right)^{-1} \tag{1}$$

This expression is intuitive: the more value the university places on the number of legacies, the larger the gap in the two cutoffs; the more value the university places on student quality, the smaller the gap in the two cutoffs.

Note also that the right hand side of equation (A.3) is the inverse of the marginal rate of substitution, MRS_{ab}. When $U(a,b)$ can be expressed as $U(\phi_a a + \phi_b b)$ with $\phi_a, \phi_b > 0$, i.e. when a and b are perfect substitutes, then MRS_{ab} is constant as in Fu (2014). Hence, when N_n increases, the cutoffs for both groups must rise by the same amount to satisfy the capacity constraint, implying fewer legacy admits.

When the university's preferences are strictly convex as in Epple, Romano, and Sieg (2006), the gap between c_n and c_l must rise when N_n increases.[15] To see this, suppose the gap remained the same. Since there are more applicants, both cutoffs must increase to satisfy the capacity constraint. With $\overline{N}$ fixed and rising cutoffs, student quality rises and the marginal utility of student quality falls. Since N_l is fixed, a higher c_l implies fewer legacy admits and the marginal utility of the number of legacies rises. The right hand side of equation (A.3) then rises. Hence the the gap between c_n and c_l must increase, which in

[14] In Appendix A, we show an analogous condition for the case where the university values characteristics of enrollees rather than characteristics of admits.

[15] We make a similar set of assumptions on university preferences as in Epple, Romano, and Sieg (2006). However, their model is substantially more complicated, incorporating the application decision itself as well as institutional budget constraints.

turn decreases $\frac{\partial U}{\partial b}\left(\frac{\partial U}{\partial a}\right)^{-1}$ until the equality holds.

Although the gap between c_n and c_l must rise when N_n increases and preferences are strictly convex, this does not necessarily imply that c_l will decline or remain the same. The movement in c_l will depend on the degree of complementarity between student quality and legacy admits. In the limiting case of perfect complements, increasing N_n will result in more legacies being admitted (c_l decreasing), to exactly balance the gains in student quality. Thus, if student quality and legacy admits are sufficiently complementary, an expansion of the NLNA applicant pool can generate an increase in the number of legacy admits. In the next section, we show that as the number on NLNA applicants expanded rapidly, the number of legacy admits remained constant. This is consistent with a strong degree of complementarity between these features of the admitted class.

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.

A remaining question is why student quality and the number of legacy admits would be complementary. One possible explanation is on the supply side of the elite college market. To the extent that legacy proxies for family wealth, boosting the number of legacy admits may enhance Harvard's ability to raise funds for investments in physical capital and human capital in the form of faculty.[16]

A second possibility is related to the demand side of the 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

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

additional legacy admits. Athlete admits also fit into this framework since they generate a consumption amenity for themselves and 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, 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.[17] 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

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

time period. While Harvard made changes to its own admissions and financial aid policies,[18] looking beyond Harvard it is clear that other elite colleges and universities experienced similar growth. In Appendix Figure B2, we graph the number of applications (Panel (a)) and the growth in applications (Panel (b)) for Harvard and other elite institutions.[19] The overall 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.[20]

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.[21] Historically, those from highly advantaged families 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

[18] 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).

[19] 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 B3, we report similar numbers for Ivy League colleges only.

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

[21] See Arcidiacono, Kinsler, and Ransom (Forthcoming) for additional details.

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. 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.[22] Thus, 26.6% of admits were legacies and athletes despite being only 3.8% of 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 then 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.[23] 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.[24] 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 Increasing Preferences vs. Trends in Applicant Strength

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

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

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

[24] Trial Exhibit P555 and Trial Exhibit DX 042 suggest that the expanding admissions advantage for LA applicants began well before the class of 2000. These sources show that the white NLNA admit rate declined from 14.3% for the class of 1983 to 9.5% for the class of 2000. For the class of 2017, the white NLNA admit rate dropped further to 4.5%. Yet, the legacy admit rate is around 35% both in the mid-1980s and for the classes of 2014–2019.

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 other colleges and universities, an increase in admissions advantages for LA applicants should imply worse outside options for those who are admitted.[25] 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.[26] 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.[27] These changes in matriculation rates are consistent with the outside options for legacies and athletes declining over time.

The matriculation patterns for NLNA and LA admits over time are consistent with a straightforward extension to the model presented in Section 2 that incorporates matriculation. In particular, Harvard may value student quality and legacy status among enrollees as

[25]It is possible that over the period under study, LA applicants improved in dimensions that Harvard values differently than other elite universities. This could result in a relative strengthening of LA applicants at Harvard, but Harvard LA applicants becoming weaker elsewhere. Given the available evidence this seems unlikely. Harvard is extremely similar to other elite universities in terms of its application patterns over time (see Figures B2 and B3). More importantly, the joint distribution of academic strength and race among Harvard applicants and *admits* is almost identical to the corresponding distributions at Yale University (see Figures 6 and 7 of Arcidiacono, Kinsler, and Ransom (2021)), consistent with similar preferences over applicant attributes.

[26]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.

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

opposed to admits. To capture this, we can simply recast the distribution of student skill to also incorporate a likelihood of attendance. Namely, applicants of higher quality should be less likely to matriculate as they will have been more likely to have been admitted to schools that are competitive with Harvard.

In the absence of changes in admissions thresholds at other schools, an increase in NLNA applicants to Harvard will still result in the admissions threshold for NLNA applicants rising with little change in the threshold for LA applicants (as long as quality and LA status are sufficiently complementary among enrollees). The increased quality of NLNA admits would imply better outside options and therefore lower matriculation rates. Since the admissions threshold for LA admits remains fairly constant, the matriculation rate should also remain flat. However, in practice we observe increasing matriculation rates for LA admits and flat matriculation rates for NLNA admits.

The model can match these patterns if matriculation probabilities conditional on applicant quality are also falling as NLNA applications rise. This will occur if other elite colleges are also becoming more competitive and thereby raising their admissions thresholds. Appendix Figure B2 shows precisely this, with total applications expanding rapidly at other elite institutions. Little change in NLNA matriculation rates over time then implies that any gains in outside options for NLNA admits due to increased admit quality are counterbalanced by the increased competitiveness of the elite college market. But the story is different for LA admits. The increased competitiveness of the elite college market results in the outside options of LA admits decreasing over time, resulting in substantial increases in matriculation rates.

4.2 Observed Applicant Strength over Time

4.2.1 SAT Scores

In addition to matriculation rates, there is also direct evidence that the academic strength of NLNA applicants has not diminished as the pool of NLNA applicants expanded. Covering the same time period, Figure 4 shows that SAT scores have been rising for whites and Asian Americans. However, this is not true for African Americans and, to a lesser extent, Hispanics.

In Arcidiacono, Kinsler, and Ransom (2021) we show that there was a substantial rise in the number of uncompetitive African American applicants between the classes of 2008 to 2012.

To ensure that changes in the African American and Hispanic applicant pools are not driving the change in the admit rate ratio between LA and NLNA applicants, we re-examine the patterns in applications and admits focusing only on non-URM applicants. 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 expanded among non-URM applicants while the quality of these applicants, as measured by SAT scores, has strengthened.

4.2.2 Harvard Ratings

SAT scores are an incomplete metric for evaluating changes in the overall strength of the NLNA applicant pool since the signal value of the SAT may vary over time and Harvard values non-academic attributes. Using publicly available data we are able to assess how the average strength of white and Asian American NLNA applicants changes over time according to Harvard's academic and non-academic ratings. An Office for Civil Rights report on Harvard admissions (Trial Exhibit P555) provides the average ratings of white and Asian American NLNA applicants for the classes of 1983–1992.[28] For the classes of 2014–2019, we can use Trial Exhibit P621 and Trial Exhibit P623 to calculate similar average ratings for white and Asian American NLNA applicants.[29] These ratings are on a scale of 1 to 5 with lower numbers indicating better ratings.[30]

The average ratings are presented in Table 1 and show no evidence of a decline in appli-

[28] Averages are not provided for NLNA applicants belonging to other racial groups. Trial Exhibit P555 does provide average ratings for athlete and legacy applicants who are white or Asian American. However, we cannot accurately calculate the corresponding values for more recent cohorts given the publicly available data. Thus, we focus on NLNA applicants.

[29] The NLNA applicants for the classes of 2014–2019 also exclude applicants on the dean's interest list and children of faculty/staff. These groups make up approximately 1% of the applicant pool and are likely to have little impact on the averages.

[30] For the average academic rating, we also rely on Trial Exhibit P618. This allows us to approximate the number of white and Asian American applicants who obtain a 5 on the academic rating. For other ratings, 4 is the highest valid score.

cant quality. Based on Harvard's academic rating, more recent cohorts of white and Asian American NLNA applicants are demonstrably stronger than those in the past, despite the massive increase in the number of applications. For the remaining non-academic ratings, there is little change over time in the average strength of the white and Asian American NLNA applicant pool. In some cases there is a slight improvement in the ratings over time (personal), while for other ratings there is a slight decline (teacher and counselor).

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. The 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% (Document 415-8).[31] 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 illustrated that the quality of the NLNA applicant is, if anything, getting stronger. In light of these patterns, 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.

But there is one other possibility: while NLNA applicant pool may be getting stronger, it may be outpaced by substantial increases in the quality of the LA applicant pool. 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

[31] 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.

admissions data for the Classes of 2014–2019. Table 2 indicates that there are nearly twenty NLNA applicants for every LA applicant with the two highest academic ratings, a 1 or a 2.[32] If Harvard had filled their admit class by 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, over 90% of the admits are recruited athletes and less than 2% are NLNAs.[33]

We can take these arguments one step further. Table 2 illustrates the relative academic strength of athlete, legacy, donor, and faculty/staff (ALDC) applicants when the ALDC/typical admit rate ratio is approximately 8:1.[34] Fixing the ALDC admit rates by academic rating, we can construct a counterfactual academic rating distribution for ALDC applicants that would generate an admit rate ratio of 4:1, or the LA/NLNA ratio observed for applicants to the Class of 2000.[35] If the growth in the admit rate ratio were solely the result of a relative strengthening of the ALDC applicant pool, this counterfactual academic rating distribution is informative about what the relative strength of the ALDC applicant pool had to be in 2000. Details on our methodology and results are presented in Appendix C.

The results of this exercise are striking (see Table C1 for full results). To generate an admit rate ratio of 4:1, 90% of ALDC applicants would need to receive an academic rating of 4 or worse. In contrast, Table 2 shows that less than 1% of typical applicants receive an academic rating of 4 or worse. The massive shift in the ALDC academic rating distribution required to drive the admit rate ratio down to 4:1 is partly the result of the extremely high admit rates for athletes. We also take a more conservative approach by assuming that all athletes are admitted at a rate of 50%, essentially treating all athletes as if they receive an academic rating equal to 5. We then ask how far we would need to

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

[33] Karabel (2005, p. 290) notes that the distribution of these categories for the Class of 1966 was also disproportionately athletes. Among applicants with a 2 on the academic rating, legacies saw an admit rate of 67% compared with an admit rate of 25% for typical applicants (see also endnote 259).

[34] A typical applicant is defined as not belonging to any of the ALDC special categories. We use ALDCs as opposed to LAs due to data limitations. However, LAs are over two-thirds of all ALDCs, so our results are unlikely to be driven by discrepancies in the set of special status applicants.

[35] We are assuming that the ALDC/typical admit rate ratio is similar to the LA/NLNA ratio in 2000.

shift the LDC (legacy/donor/faculty child) academic rating distribution such that the overall ALDC/typical admit rate ratio remains at 4:1. In this scenario we find that 40% of LDC applicants would need to receive an academic rating of 4 or worse. Moreover, the average LDC academic rating would be 3.35, meaning that LDC applicants would need to be almost 0.7 standard deviations weaker on the academic rating than typical applicants.

For the growth in the admit rate ratio to reflect an increased relative strength of the ALDC applicant pool, we would need to believe that in the Class of 2000 ALDC applicants were incredibly weaker relative to typical applicants. Admission data for the classes of 1982-1993 period indicate that this is implausible. According to Trial Exhibit P555, white and Asian legacy applicants are actually stronger academically than their NLNA peers.

5 Expanding LA Preferences and Racial Diversity

The evidence presented in the previous sections suggests that, over the past 20 years, Harvard has provided an increasing admissions advantage to legacy and recruited athlete applicants. Historically, these applicants are believed to come from primarily white and economically advantaged households.[36] However, there have been broad changes to the higher education marketplace in the past half-century that may alter the set of individuals able to benefit from these advantages. In particular, the representation of minority students at elite American colleges and universities increased in the 1970s, and the children of this earlier generation of minority students now stand to potentially benefit from legacy admissions.[37] On the other hand, minority students are still under-represented relative to whites among LA applicants and may therefore be hurt by increased advantages for legacies and athletes. In this section, we examine the impact of these two channels on minority admissions.

[36] Arcidiacono, Kinsler, and Ransom (Forthcoming) document that LA applicants are more than two-thirds white and come from families with much higher incomes.

[37] Howell and Turner (2004) explore this idea using admissions data and trends from the University of Virginia. At the time of writing in 2002, they projected a three-fold increase in the share of legacy applicants that are African American by 2025.

5.1 LA and NLNA Trends by Race

To investigate whether minorities benefit more from legacy and athlete admissions advantages in the current period relative to 20 years ago, we begin by replicating Panel (a) of Figure 2 for four racial categories of Harvard applicants: Asian American, African American, Hispanic, and white/unknown.[38] The resulting graphs are presented in Figure 6. Consistent with the overall picture in Figure 2, we see that the LA share of applications is falling over this period for all racial groups other than Asian Americans.[39]

A very different story emerges when we examine trends in the LA share of admits. Figure 2 indicates that the overall share of admits that are legacies and athletes remained flat from 2000 to 2017. In stark contrast, Figure 6 shows that, for all racial groups, the LA share of admits increased. As an example, the LA share of Hispanic admits increased from approximately 3% in 2000 to 12% in 2017. How is it possible that the overall LA share of admits is flat, but that the trend is upward within racial groups? The key feature that explains this result is the declining proportion of white/unknown admits, from 62% in 2000–2002 to 53% in 2015–2017. The LA share of white/unknown admits is approximately 35%, while the same share for the other racial groups is between 5% and 13%. Thus, as the proportion of the admitted class that is non-white grows, the LA share of all admits stays flat despite the fact that, within race, LA admits are becoming more prevalent. When viewed through this lens, it suggests that the admissions advantage for legacy and athlete applicants is probably growing even faster than what Figure 2 indicates.

A key takeaway from Figure 6 is that all racial groups appear to experience increases in legacy and athlete admissions boosts. Within each racial category, the LA share of admits is

[38]It is important to include in the analysis applicants who fail to report their race, since the patterns over time are quite different for this group. The number of LA and NLNA applicants and admits who fail to report race declined considerably between 2000 and 2017. This is especially true in relative terms since the totals for all other racial categories rose (see Table B2). By including the unknown group with white applicants, we illustrate that the overarching patterns we observe are not being driven by this unique group. One may expect the unknown group to consist primarily of white and Asian American applicants—the only two racial groups who would have an incentive to withhold their race. The composition of the group has likely shifted over time, since the number of Asian American applicants has grown faster than the number of white applicants. The patterns for whites alone would be starker than what our figure indicates. See Figure B1 for additional detail.

[39]For Asian Americans, the LA share of applicants increases, but the levels are small both at the beginning (1.2%) and end (1.6%) of the period.

growing while the LA share of applicants is falling (with the exception of Asian Americans). However, it is difficult to infer from these pictures whether a growing number of minority students are benefiting from LA preferences. To address this, we provide in Table B2 the raw numbers of LA and NLNA applicants and admits by race, aggregated into three-year windows. The raw data indicate that an increasing number of minority students are in a position to benefit from LA preferences. Between 2000–2002 and 2015–2017, the number of African American, Hispanic, and Asian American LA applicants increased by 42%, 158%, and 130%, respectively. The increase in the number of LA admits was more muted, ranging from 35% for African Americans to 69% for Hispanics.

While the raw numbers indicate that more minorities are in a position to benefit from increasing LA admissions advantages, they tend to mask two important broader trends. First, despite the recent growth in minority LA applications and admits, the corresponding levels of white LA applicants and admits remain an order of magnitude larger. In the 2015–2017 period, 68% of LA applications were from white applicants (78% if we also include applicants who fail to report their race). As a result, when LA admissions advantages increase, white applicants are likely to experience the largest gain. The second broader trend is the growth in NLNA applications among minority groups. Between 2000–2002 and 2015–2017, the number of NLNA African American, Hispanic, and Asian American applications increased by 274%, 214%, and 112%, respectively. The growth among these groups outstripped growth for whites such that the white share of NLNA applications fell from 43% to 40%.[40] Thus, the increased advantages for LA applicants have worked to the detriment of a growing share of minority NLNA applicants.

5.2 Compositional Effects of LA Access and Preferences

Between 2000 and 2017, the racial composition of the admitted class at Harvard has been affected by two changes in the admission process related to legacy and athlete applicants. First, the number and share of minority LA applications is growing. This implies a growing

[40]The white/unknown NLNA application share fell from 57% to 47% by the end of the period. To calculate the numbers in the main text and this footnote, we also include "Other" and "Nat Am/Nat HI" [Native American or Native Hawaiian] NLNA applicants in 2000–2002 and 2015–2017.

share of minority admits, since Harvard employs preferences for LA applicants. Second, LA admissions advantages have expanded over this time period. Since white applicants continue to make up the majority of LA applicants, this expansion will still tend to favor white applicants. In the counterfactuals below, we investigate how each of these channels has affected the LA and racial composition of the admitted class, comparing in particular the changes between 2000–2002 and 2015–2017. We show that the increased preferences given to LA applicants over time—which disproportionately favor whites—dominates the gains minorities have achieved though increased representation in the LA pool.

5.2.1 Counterfactual 1: increases in minority admissions due to increases in LA shares

Our first counterfactual examines how minorities have gained seats as a result of increased representation in the LA applicant pool. In 2000–2002, the share of LA applicants that were African American, Hispanic, or Asian American was 4.9%, 2.2%, and 4.6% respectively. We match these shares in 2015–2017 by reducing the number of African American, Hispanic, or Asian American LA applicants and shifting the excess applicants to the NLNA applicant pool. As a result, we do not change the overall number of minority applicants, we simply shift the relative quantities between the LA and NLNA applicant pool.

Let r indicate race, $r \in \{a, b, h, w\}$; s indicate legacy/athlete status, $s \in \{l, n\}$; and t indicate the first three years of the data (2000–2002) or the last three (2015–2017), $t \in \{0, 1\}$. Denote N_{rst} and A_{rst} as the number of respective applicants and admits who have characteristics $\{r, s\}$ and applied in period t. Denote the strength of applicant i in the set $\{r, s, t\}$—that is, including any admissions advantages from LA status—by $\beta_{rst} + \epsilon_i$. β_{rst} is the average strength of the applicant with characteristics $\{r, s\}$ in period t, and ϵ_i represents deviations from the average. Applicants are ordered according to their strength, with Harvard admitting students until its capacity constraint binds.

Assuming that ϵ_i follows a logistic distribution,[41] the average probability of admission

[41] Our results are nearly identical if we instead assume that ϵ_i is drawn from a normal distribution.

for someone in the set $\{r, s, t\}$, P_{rst}, can be expressed in logit form:

$$P_{rst} = \frac{\exp(\beta_{rst})}{1 + \exp(\beta_{rst})} = \frac{A_{rst}}{N_{rst}} \tag{2}$$

Since we observe the admit rates for each race, legacy/athlete status, and time period combination, we can calculate β_{rst} for all r, s, and t. As an example, Table B2 indicates that there are 32,940 white NLNA applicants and 1,641 white NLNA admits in 2015–2017. The observed admit probability for this group is 4.98%, implying that $\beta_{wn1} = -2.95$.

We now outline a set of assumptions that allows us to recover how the shift in the legacy applicant pool affected admissions across racial groups. To do this, we first shift down the number of legacy applicants that are of each race—with the exception of whites—such that the racial composition of legacy applicants in 2015–2017 is the same as in 2000–2002.[42] Let $N^{(1)}_{wl1} = N_{wl1}$, where the superscript denotes counterfactual 1. We then choose $N^{(1)}_{rl1}$ for all $r \neq w$ such that:

$$\frac{N^{(1)}_{rl1}}{\sum_{r'} N^{(1)}_{r'l1}} = \frac{N_{rl0}}{\sum_{r'} N_{r'l0}} \tag{3}$$

The number of NLNA applicants of race r is then $N^{(1)}_{rn1} = N_{rn1} + N_{rl1} - N^{(1)}_{rl1}$.

Next, we assume that the shifting of minority LA applicants to NLNA applicants does not affect the average characteristics of either group. This assumption is likely to be violated: we would expect minority LA applicants to be stronger than minority NLNA applicants as LA applicants come from wealthier households (Arcidiacono, Kinsler, and Ransom, Forthcoming). Hence, shifting some of them to NLNA would raise the average characteristics of NLNAs, leading us to overstate minority gains in admissions from changes in the racial composition of legacies and athletes. However, given the small share of minority applicants who are legacies or athletes, the effect is likely to be small.

With fewer LA applicants, overall admission rates would need to be higher for the same number of students to be admitted. Let $\Delta^{(1)}$ be the rise in the admissions index for all applicants such that the total number of admits is the same as the status quo in period 1.

[42] We also hold fixed the number of LA applicants belonging to all other racial groups and the unknown race group.

The counterfactual probability of admission for $\{r, s, t\}$ is then:

$$P_{rs1}^{(1)} = \frac{\exp(\beta_{rs1} + \Delta^{(1)})}{1 + \exp(\beta_{rs1} + \Delta^{(1)})} \tag{4}$$

where $\Delta^{(1)}$ satisfies:

$$\sum_r \sum_s N_{rs1}^{(1)} P_{rs1}^{(1)} = \sum_r \sum_s A_{rs1} \tag{5}$$

Once we solve for $\Delta^{(1)}$, we can calculate the predicted number of admits for every race and status combination:

$$A_{rs1}^{(1)} = N_{rs1}^{(1)} P_{rs1}^{(1)}. \tag{6}$$

We can also calculate the share of admits of race r that are legacy/athlete: $A_{rl1}^{(1)} / \left(\sum_s A_{rs1}^{(1)} \right)$.

The total number of admits and the LA share of admits for 2015–2017 based on this counterfactual are reported in the second row of Table 3, with the first row showing the actual outcomes in 2015–2017. The number of white admits in the status quo (2,587) is significantly lower than the predicted number of white admits when LA access is reduced (2,651). All other racial groups have more admits in the status quo. In other words, the growing representation of minorities in the LA applicant pool between 2000 and 2017 has significantly increased the number of minority applicants admitted to Harvard. To be more precise, the admissions gains from increased minority representation in the LA pool range from 1.0% for African Americans to 3.8% for Asian Americans. This result is unsurprising since LA applicants receive significant preferences in admissions, and there are now more minority applicants in a position to benefit from these preferences.

5.2.2 Counterfactual 2: decreases in minority admissions due to increasing admissions advantages for LA applicants

Weighed against these benefits is the increased admission tip for LA applicants, since LA applicants are disproportionately white. In our second counterfactual, we examine how the increased admissions advantage for LA applicants affected admissions by race and LA status. Namely, we change the admissions thresholds such that the following two conditions are met:

(i) the overall admit rate ratio between LA and NLNA applicants corresponds to what it

was in period 0 (2000–2002), which is 4.15.[43]

(ii) the total number of admits is the same as in the status quo in period 1.

The counterfactual admissions probabilities involve changing the admissions threshold differently for LA and NLNA applicants and are are given by:

$$P_{rs1}^{(2)} = \frac{\exp(\beta_{rs1} + \Delta_s^{(2)})}{1 + \exp(\beta_{rs1} + \Delta_s^{(2)})}. \tag{7}$$

$\Delta_n^{(2)}$ and $\Delta_l^{(2)}$ then solve the admit rate ratio constraint

$$\frac{\sum_r N_{rl1} P_{rl1}^{(2)}}{\sum_r N_{rl1}} \frac{\sum_r N_{rn1}}{\sum_r N_{rn1} P_{rn1}^{(2)}} = 4.15 \tag{8}$$

and the capacity constraint

$$\sum_r \sum_s N_{rs1} P_{rs1}^{(2)} = \sum_r \sum_s A_{rs1}. \tag{9}$$

We solve equations (8) and (9) for the two unknowns $\Delta_n^{(2)}$ and $\Delta_l^{(2)}$. Note that, because the LA/NLNA admit rate ratio has increased substantially between the two periods, $\Delta_n^{(2)}$ will be positive and $\Delta_l^{(2)}$ will be negative.

The third row of Table 3 shows how the 2015–2017 number of admits and LA share change for each racial group when LA preferences are reduced to the their 2000-2002 level. Relative to the status quo, there is a 7% drop in the number of white admits (from 2,587 to 2,412), and an increase of 6.2%, 7.1%, and 7.1% in the number of African American, Hispanic, and Asian American admits, respectively. This pattern is consistent with the fact that the vast majority of LA applicants are white, and thus suffer the most when LA preferences are reduced to their 2000-2002 levels. Within race, the LA share of admits also falls dramatically. For whites, the LA share falls by 38%, and for each minority group the LA share falls by at least 44%. The expansion of admission advantages for LA applicants in the most recent period has therefore led to a large increase in not only the number of

[43]The same number in period 1 (2015–2017) is 8.15. Implicit in this exercise is that a change in admissions advantage is responsible for the change in the admit rate ratio. We return to this point in Section 5.2.4.

LA admits but also the number of white admits since they disproportionately fall in the LA category.

5.2.3 Counterfactual 3: net changes in minority admissions from the two channels

In our final counterfactual, we shift both the minority share of LA applicants as well as the LA/NLNA admit ratio to what it was in 2000–2002, combining the first two counterfactuals. Namely, we set the number of applicants in each race and status combination to the level it was in the first counterfactual, $N^{(3)}_{rs1} = N^{(1)}_{rs1}$ for all $\{r, s\}$. Next, we solve (8) and (9) by substituting $N^{(3)}_{rl1}$ for N_{rl1}. Defining $P^{(3)}_{rs1}$ as

$$P^{(3)}_{rs1} = \frac{\exp(\beta_{rs1} + \Delta^{(3)}_s)}{1 + \exp(\beta_{rs1} + \Delta^{(3)}_s)}, \tag{10}$$

our two equations are then:

$$\frac{\sum_r N^{(3)}_{rl1} P^{(3)}_{rl1}}{\sum_r N^{(3)}_{rl1}} \frac{\sum_r N^{(3)}_{rn1}}{\sum_r N^{(3)}_{rn1} P^{(3)}_{rn1}} = 4.15 \tag{11}$$

and the capacity constraint

$$\sum_r \sum_s N^{(3)}_{rs1} P^{(3)}_{rs1} = \sum_r \sum_s A_{rs1} \tag{12}$$

where we solve for $\Delta^{(3)}_n$ and $\Delta^{(3)}_l$.

The last row of Table 3 shows that if LA minority representation and LA preferences were both returned to their 2000–2002 levels, more minority students would have been admitted over the 2015–2017 period. That is, the decreases in minority admits resulting from a lower presence of minority legacy applicants are more than offset by the increases in minority admits associated with a lower admissions advantage for LA applicants. The gains in seats range from 5.8% for African Americans (an increase from 695 to 735) to 5.1% for Asian Americans.

5.2.4 Robustness

In our counterfactual exercises, we assume that the rise in the LA/NLNA admit rate ratio between 2000 and 2017 is the result of expanded preferences for LA applicants as opposed to a weakening of the NLNA applicant pool. The evidence presented in Section 4 supports this assumption, with the strength of the average NLNA applicant holding fairly steady between 2000 and 2017. However, there are subgroups of NLNA applicants that appear to have weakened over time. In Arcidiacono, Kinsler, and Ransom (2021), we show that starting in 2008 Harvard greatly expanded its recruitment of African American applicants (and to a lesser degree Hispanic applicants) and that these additional applicants had essentially no chance of admission. This can affect our counterfactuals since the pool of the African American NLNA applicants in 2015–2017 is inflated with applicants who will never be admitted even if LA preferences are lessened.

To address this, we repeat our counterfactual analysis, but artificially reduce the number of URM (African American and Hispanic) applicants. We use the growth rate in Asian American NLNA applicants to determine how many URM applicants would have applied post-2008 if Harvard had not expanded its recruiting efforts. Table B3 shows the resulting NLNA applicant pool over time and provides greater detail on how we derive the post-2008 numbers for URM applicants. In 2015–2017, we project that the number of African American NLNA applicants would have dropped to 6,051 from the observed value of 10,193 if the expanded recruitment effort did not occur. Importantly, we maintain the same number URM NLNA admits, since the recruiting effort did not change the number of URM admits.[44] As a result, the admit rate for African American and Hispanic NLNA applicants is significantly higher when compared to the analysis that includes all URM NLNA applicants. This gets reflected in the β_{r01} for $r = \{b, h\}$.

Table 4 shows the results of our counterfactual analysis with the reduced URM applicant pool after 2008. The first four rows of the table are structured exactly as in Table 3, illustrating how the number and LA share of admits changes from the status quo for each

[44]See Arcidiacono, Kinsler, and Ransom (2021) for details on the changes in URM admissions associated with expanded recruiting efforts. Note that we are assuming that the expanded recruiting efforts did not draw in additional URM LA applicants.

racial group as we return LA access, LA preferences, and both LA access and preferences to their 2000–2002 levels. Accounting for the weakening of the URM NLNA applicant pool does little to change our key finding that the gains from a higher presence of minority legacy applicants are more than offset by the losses associated with higher admissions advantage for LA applicants. The number of African American admits in 2015–2017 would have risen from 695 to 730, a 5% increase, if both LA preferences and LA access were fixed at their 2000–2002 levels.

Removing non-competitive NLNA applicants has little impact on our compositional analysis because the admit rate for URMs adjusts once the non-competitive applicants are eliminated. This counterbalances the fact that there are fewer URM NLNA applicants in the pool to draw from when LA preferences are reduced and that fewer NLNA applicants are ultimately admitted (note that the LA shares in counterfactuals 2 and 3 are higher in Table 4 relative to Table 3). NLNA admits decline since the LA/NLNA admit rate ratio under the status quo declines from 8.15 to 7.71 when non-competitive URM applicants are excluded. As a result, fewer LA admits need to be dropped and fewer NLNA admits need to be added to bring this ratio back to its 2000–2002 level.

The remaining rows of Table 4 illustrate how the composition of the admit class under counterfactual 3 is impacted by targeting different LA/NLNA admit rate ratios. While the evidence strongly suggests that the increase in the admit rate ratio from 4.15 to 7.71 (when non-competitive URMs are excluded) reflects a shift in preferences, targeting admit rate ratios above 4.15 illustrates how a relative weakening of the NLNA applicant pool over time would impact our findings. For example, targeting an LA/NLNA admit rate ratio of 6.15 assumes that more than 50% of the change from 4.15 to 7.71 is strictly the result of NLNA applicants becoming relatively weaker. Even in this extreme scenario, there are fewer white admits and more African American admits relative to the status quo when LA preferences further expand the admit rate ratio from 6.15 to 7.71.

6 Conclusion

Admissions to elite colleges and universities have become increasingly competitive. At Harvard, the admit rate is now less than 4%. 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.

At the same time that legacy and athlete preferences have grown at Harvard, the share of LA applicants and admits who are minorities has increased. However, LA applicants and admits are still disproportionately white compared to NLNA applicants and admits. So while the number of minority admits have increased as a result of a higher representation among legacies and athletes, we show that these increases are more than offset by the rise in advantages given to LA applicants.

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.[45] One approach to lessen these advantages would be to expand enrollment. A number of economists have advocated for this, claiming that a reduction in applicant competition would reduce tensions around legacy and athlete admissions.[46] 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 only intensify unless significant changes are made to admissions policies.

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

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

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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.

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Trial Exhibit P621. 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/P621.pdf. Ratings frequencies for baseline sample.

Trial Exhibit P623. 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/P623.pdf. Ratings frequencies for expanded sample.

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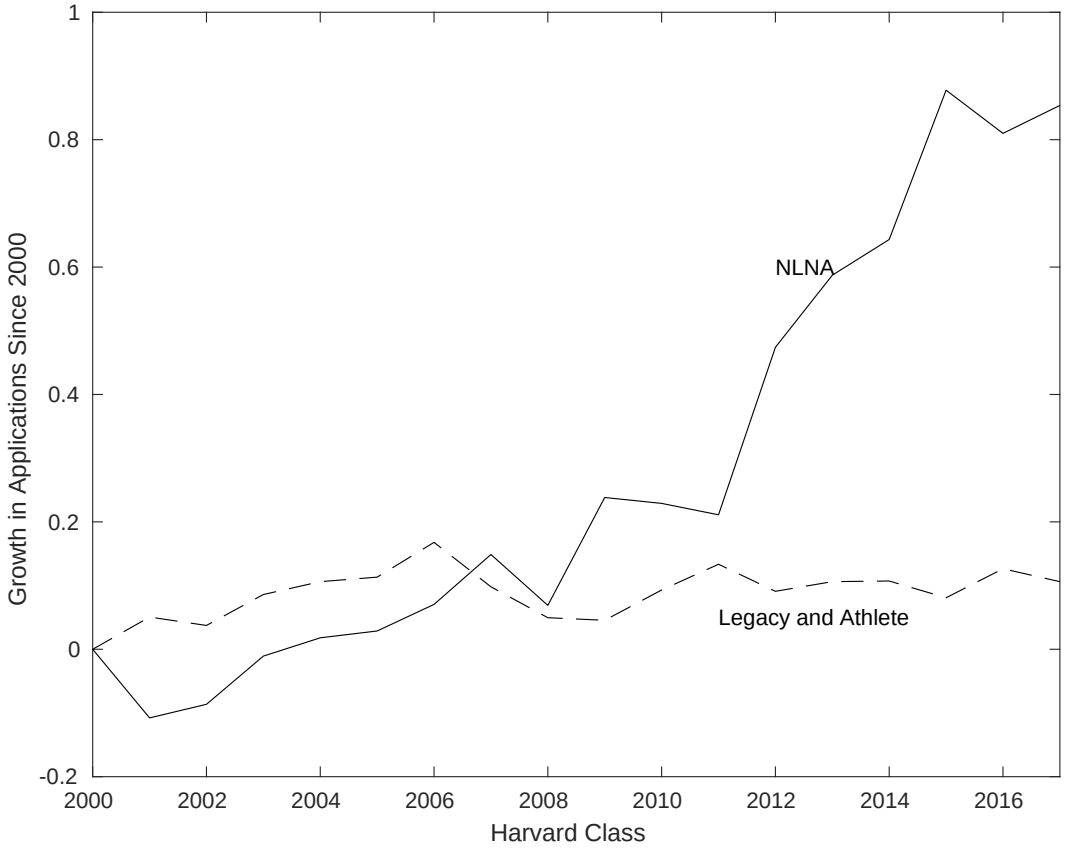
Figures and Tables

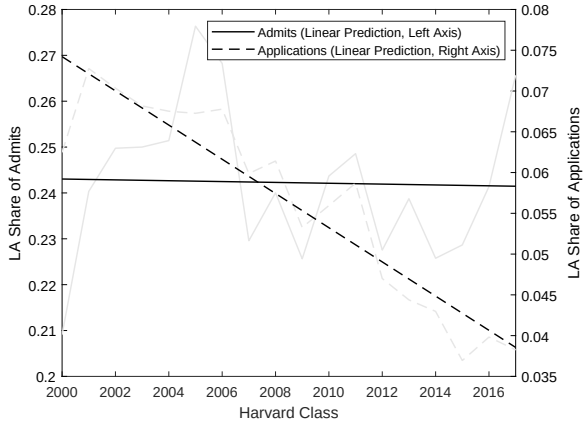
Figure 1: Growth in LA and NLNA Applications, Classes of 2000–2017



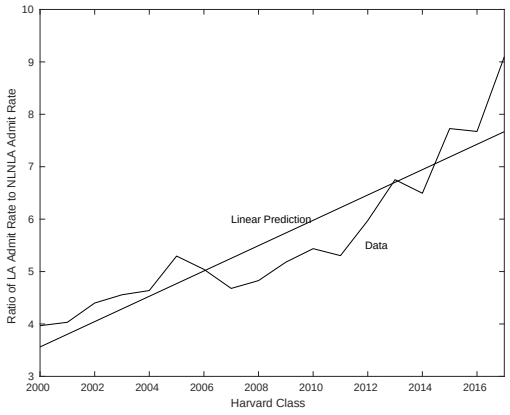
Note: Includes only domestic applicants. Growth is defined as the number of applications in a given year minus the number of applications in the Class of 2000, all divided by the number of applications in the Class of 2000.
Source: Authors' calculations from *SFFA v. Harvard* Trial Exhibit DX 042.

Figure 2: Trends in LA Composition and Admissions Rates

(a) Share of Applicants and Admits who are LA

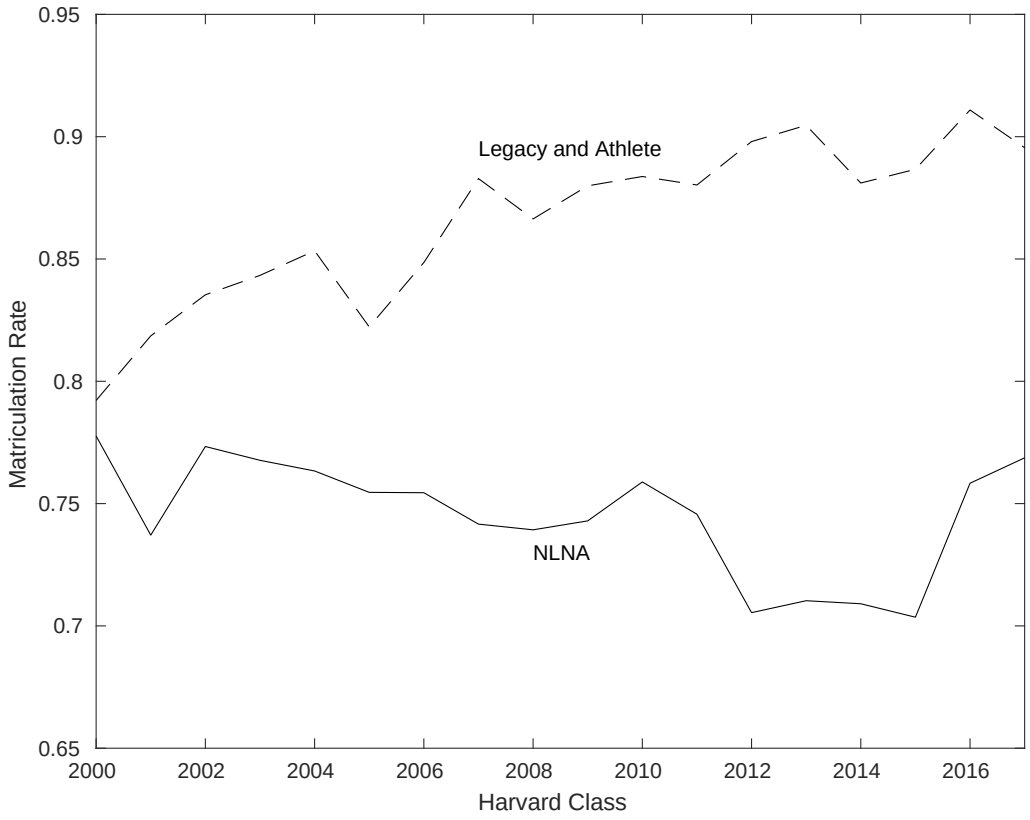


(b) Ratio of LA Admit Rates to NLNA Admit Rates



Note: Domestic applicants only. Raw data for panel (a) is in light gray.
Source: Authors' calculations from *SFFA v. Harvard* Trial Exhibit DX 042.

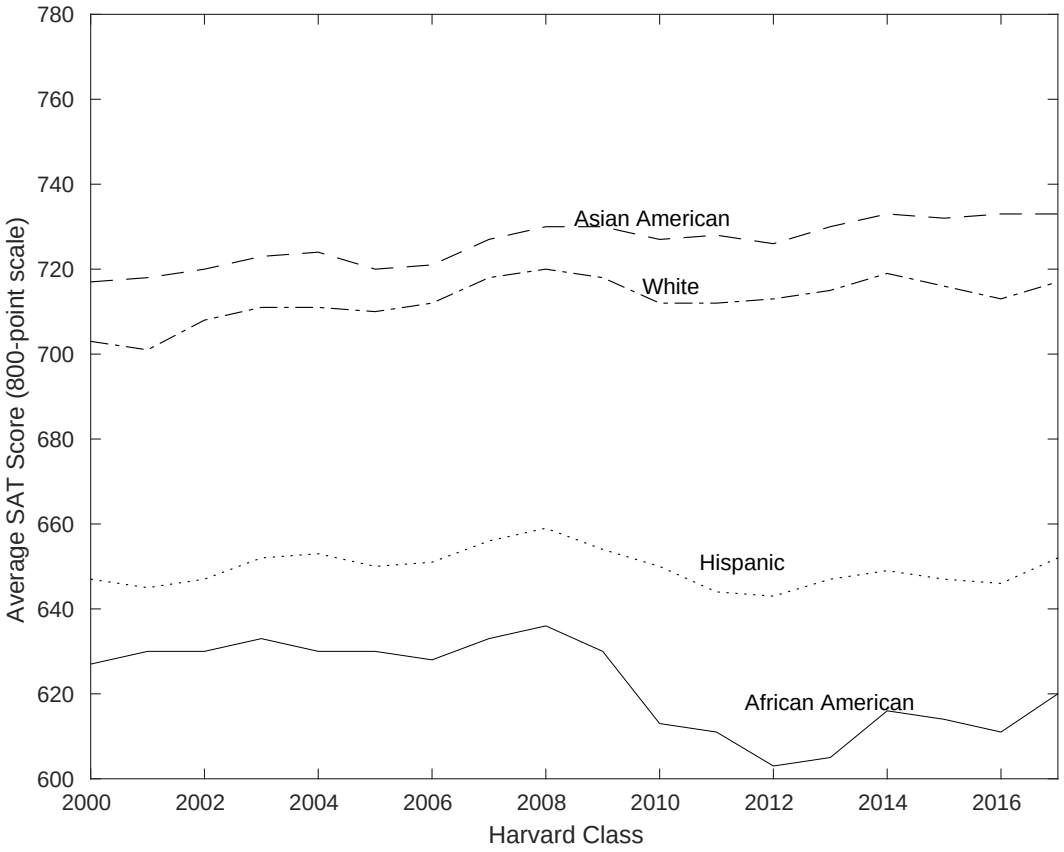
Figure 3: Trends in Matriculation by LA and NLNA



Note: Includes domestic applicants only.

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

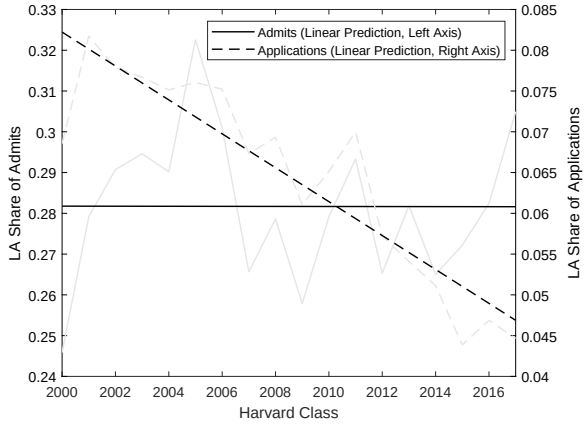
Figure 4: Average SAT Test Scores Over Time for Domestic Applicants



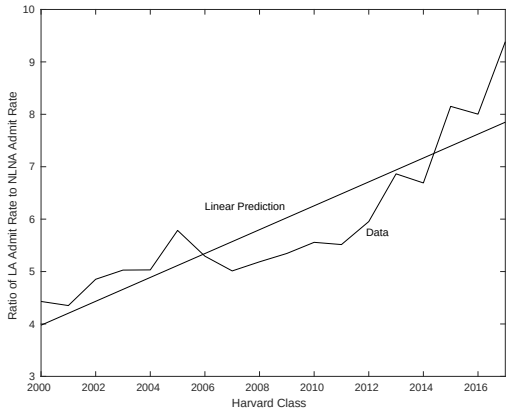
Source: Authors' calculations from *SFFA v. Harvard* Trial Exhibit DX 042.

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

(a) Share of Applicants and Admits who are LA



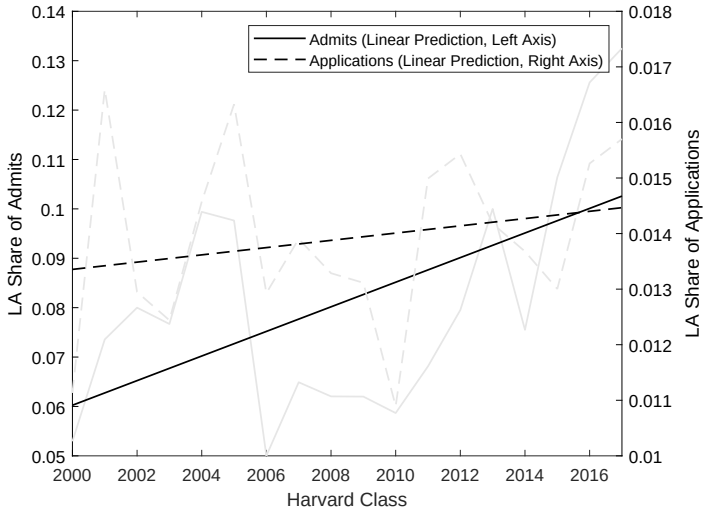
(b) Ratio of LA Admit Rates to NLNA Admit Rates



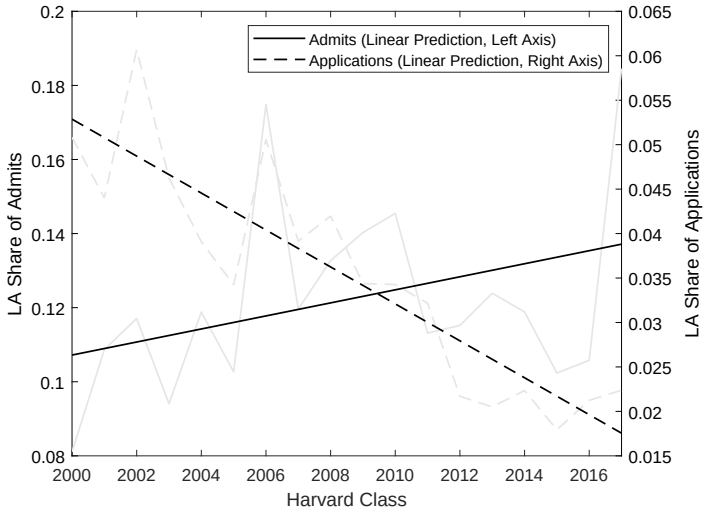
Note: Domestic, non-URM applicants only. Raw data for panel (a) is in light gray.
Source: Authors' calculations from *SFFA v. Harvard* Trial Exhibit DX 042.

Figure 6: Trends in LA Share of Applications and Admits by Race

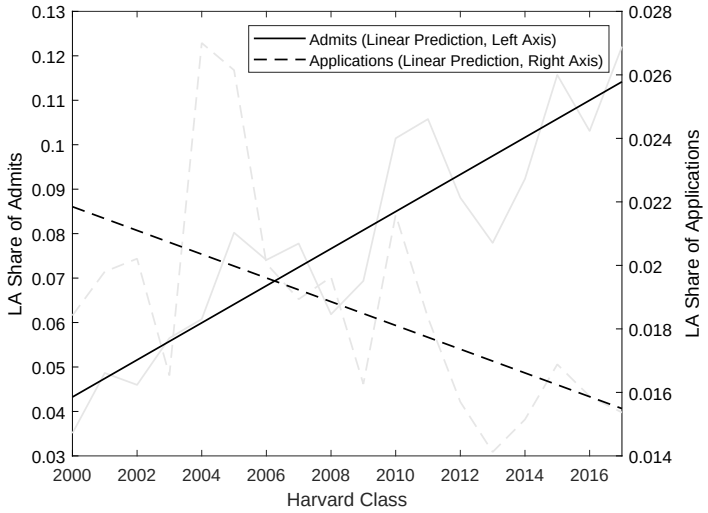
(a) Asian American



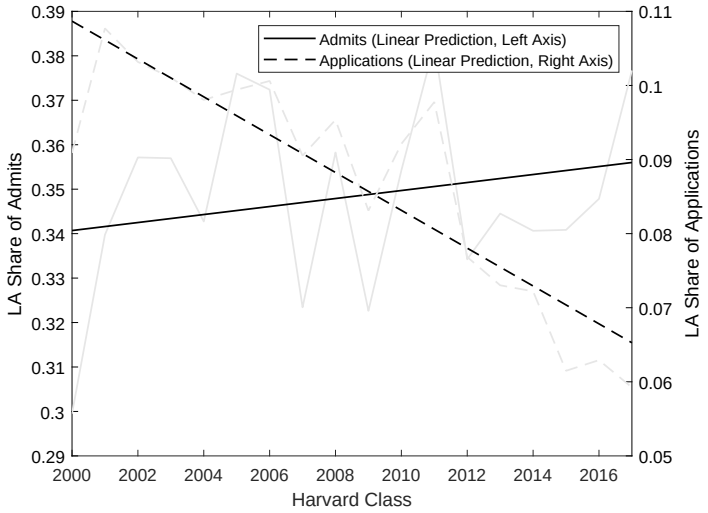
(b) African American



(c) Hispanic



(d) White or Unknown



Note: Domestic applicants only. Raw data is in light gray.

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

Table 1: Strength of NLNA Applicants on Harvard Ratings Over Time

	Classes of 1983-1992		Classes of 2014-2019	
Harvard Rating (1-5)	White	Asian American	White	Asian American
Academic	2.97	2.86	2.67	2.49
Extracurricular	2.75	2.77	2.78	2.73
Athletic	3.15	3.35	3.19	3.41
Personal	2.81	2.84	2.79	2.83
Teacher	2.61	2.57	2.66	2.66
Counselor	2.67	2.62	2.72	2.73

Note: Lower numerical ratings indicate strength. For the Classes of 2014-2019, only domestic applicants are included. Additionally, applicants on the dean's interest list and applicants who are children of faculty or staff are also excluded from the ratings calculations for the Classes of 2014-2019.

Source: Authors' calculations for the Classes of 2014-2019 from *SFFA v. Harvard* Trial Exhibit P621, Trial Exhibit P623, and Trial Exhibit P618. For the Classes of 1985-1992 we rely on Table 10 of Trial Exhibit P555.

Table 2: Admit Rates (%) by ALDC Status and Academic Rating, Classes of 2014-2019

			Group		
Academic Rating	Rating Description	Quantity	Typical	LDC	Athlete
1	"Summa potential; Genuine scholar; Perfect grades and test scores"	Applicants	612	60	1
		Admits	405	58	1
		Admit Rate	66.18	96.67	100.00
2	"Magna potential; Excellent student; Superb grades, 1450+ SAT"	Applicants	59,731	3,118	303
		Admits	5,986	1,528	291
		Admit Rate	10.02	49.01	96.04
3	"Cum laude potential; Excellent grades; 1300–1450 SAT"	Applicants	57,874	2,444	821
		Admits	1,390	442	716
		Admit Rate	2.40	18.09	87.21
4	"Adequate preparation; Respectable grades; 1200–1300 SAT"	Applicants	18,176	373	210
		Admits	3	13	167
		Admit Rate	0.02	3.49	79.52
5	"Marginal potential; Modest grades; 1000–1200 SAT"	Applicants	6,335	46	8
		Admits	0	0	4
		Admit Rate	0.00	0.00	50.00
Total		Applicants	142,728	6,041	1,343
		Admits	7,784	2,041	1,179
		Admit Rate	5.45	33.79	87.79

Notes: "ALDC" refers to applicants who are recruited athletes, legacies, donor-connected, or children of Harvard employees. "LDC" refers to the latter three categories. "Typical" refers to applicants who do not belong to any ALDC category.

Latin honors such as "summa," "magna," or "cum laude" refer to the admissions officer's prediction of how the student will fare academically at Harvard. The top 5 percent of Harvard students earn summa cum laude honors at graduation, the top 20 percent earn magna cum laude honors, and the top 50 percent earn cum laude honors. For more details, see Harvard College (2021, pp. 32–34).

Sources: Data presented in Trial Exhibit P618. The final set of rows is computed by the authors using the information in the preceding sets of rows. Rating descriptions are taken from Trial Exhibit P001.

Table 3: Racial Compositional Effects of Increased LA Access and Preferences

	White		African American		Hispanic		Asian American	
	Admits	LA Share	Admits	LA Share	Admits	LA Share	Admits	LA Share
Status Quo, 2015–2017								
Expand LA Access & Admissions Advantage	2,587	0.366	695	0.131	649	0.114	1,245	0.121
Counterfactuals, 2015–2017								
1: Return LA Access to 2000-2002 Level	2,651	0.363	688	0.090	626	0.045	1,199	0.054
2: Return LA Advantage to 2000-2002 Level	2,412	0.227	738	0.072	696	0.062	1,334	0.068
3: Return Both	2,448	0.229	735	0.049	684	0.024	1,308	0.030

Notes: "LA Access" refers to the extent to which racial minorities have access to LA admissions advantage. "Admissions Advantage" refers to the extent to which LA applicants of any race are treated preferentially in admissions.

Source: Authors' calculations from data reported in Trial Exhibit DX 042.

Table 4: Racial Compositional Effects of Increased LA Access and Preferences, Robustness

	Size of LA	White		African American		Hispanic		Asian American	
	Advantage	Admits	LA Share	Admits	LA Share	Admits	LA Share	Admits	LA Share
Status Quo, 2015–2017									
Expand LA Access & Admissions Advantage	7.71	2,587	0.366	695	0.131	649	0.114	1,245	0.121
Counterfactuals, 2015–2017									
1: Return LA Access to 2000-2002 Level	7.71	2,649	0.363	689	0.090	626	0.045	1,199	0.054
2: Return LA Advantage to 2000-2002 Level	4.15	2,427	0.237	732	0.076	693	0.066	1,329	0.072
3: Return Both	4.15	2,463	0.240	730	0.052	680	0.026	1,300	0.031
	4.65	2,493	0.261	724	0.058	671	0.029	1,284	0.035
	5.15	2,523	0.281	717	0.064	663	0.032	1,268	0.038
	5.65	2,551	0.300	711	0.070	654	0.035	1,252	0.042
	6.15	2,579	0.318	705	0.075	646	0.038	1,237	0.045
	6.65	2,605	0.336	699	0.081	639	0.040	1,223	0.048
	7.15	2,631	0.352	693	0.086	631	0.043	1,209	0.051
	7.65	2,656	0.367	688	0.092	624	0.046	1,195	0.054

Notes: All counterfactuals are calculated after removing non-competitive under-represented minority applicants. See Section 5.2.4 and Table B3 for additional details.

"LA Access" refers to the extent to which racial minorities have access to LA admissions advantage. "Admissions Advantage" refers to the extent to which LA applicants of any race are treated preferentially in admissions.

Source: Authors' calculations from data reported in Trial Exhibit DX 042.

A Modeling enrollment instead of admissions

In this appendix, we examine the implications of changing the university's objective function in Section 2 such that they value characteristics of the enrollees rather than characteristics of the admits. Denote $f_s(x)$ as the probability that an admitted student of ability x and status s would enroll. Our maximization problem then becomes:

$$\max_{c_l, c_n} U(a, b) \text{ s.t. } N_l \left(1 - \int_{c_l} \phi_l(x) f_l(x) dx\right) + N_n \left(1 - \int_{c_n} \phi_n(x) f_n(x) dx\right) = \overline{N}$$

$$a := N_l \int_{c_l} x \phi_l(x) f_l(x) dx + N_n \int_{c_n} x \phi_n(x) f_l(x) dx \qquad \text{(quality of enrollees)}$$

$$b := N_l [1 - \int_{c_l} \phi_l(x) f_l(x) dx] \qquad \text{(total legacy enrollees)}$$

The first order conditions of the Lagrangian with respect to c_l and c_n yield:

$$0 = -\frac{\partial U}{\partial a} N_l c_l \phi_l(c_l) f_l(c_l) - \frac{\partial U}{\partial b} N_l \phi_l(c_l) f_l(c_l) + \lambda N_l \phi_l(c_l) f_l(c_l) \tag{A.1}$$

$$0 = -\frac{\partial U}{\partial a} N_n c_n \phi_n(c_n) f_n(c_n) + \lambda N_n \phi_n(c_n) f_n(c_n) \tag{A.2}$$

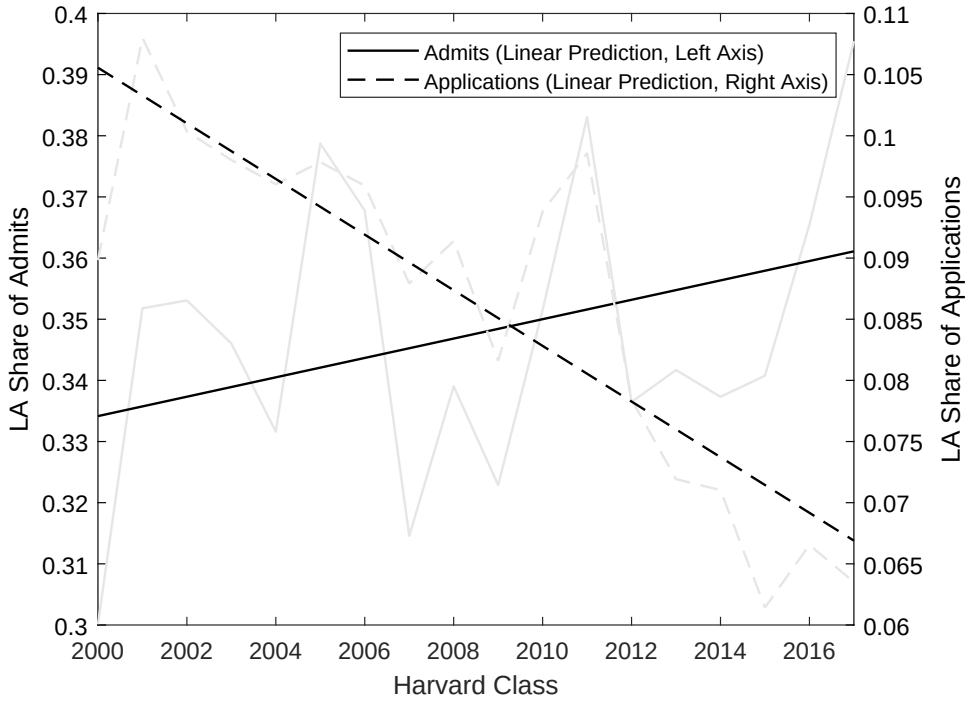
As in the case where the objective function is specified with respect to admissions, combining these two first order conditions yields:

$$c_n - c_l = \frac{\partial U}{\partial b} \left(\frac{\partial U}{\partial a}\right)^{-1} \tag{A.3}$$

implying the discussion in Section 2 regarding the implications of expanding the number of non-legacy applicants is the same when the objective function includes characteristics of enrollees rather than the characteristics of applicants.

B Supporting Figures and Tables

Figure B1: Trends in LA Share of Applications and Admits for Whites Only



Note: Domestic applicants only.

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

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.

Table B2: Applicants and Admits by Race and Special Status

	Legacy and Athlete					Non-Legacy and Non-Athlete				
Classes	White	African American	Hispanic	Asian American	Unknown	White	African American	Hispanic	Asian American	Unknown
Panel A: Applications										
2000–2002	1,952	150	66	139	683	17,764	2,728	3,323	10,179	5,901
2003–2005	2,184	135	90	158	651	20,260	3,262	3,780	10,752	5,399
2006–2008	2,367	165	93	171	436	23,445	3,601	4,674	12,600	3,123
2009–2011	2,176	193	116	188	522	21,736	5,559	6,054	14,284	5,292
2012–2014	2,150	187	130	259	500	27,108	8,506	8,556	17,775	6,068
2015–2017	2,243	213	170	320	301	32,940	10,193	10,421	21,591	6,084
Panel B: Admits										
2000–2002	886	59	23	75	328	1,756	515	507	1,007	687
2003–2005	1,033	62	36	88	273	1,901	527	509	880	433
2006–2008	1,055	85	38	64	164	2,043	518	498	1,018	208
2009–2011	946	88	55	73	203	1,748	574	533	1,084	364
2012–2014	912	82	53	104	215	1,783	605	566	1,128	407
2015–2017	946	91	74	151	116	1,641	604	575	1,094	291

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

Table B3: Applicants and Admits by Race and Status after removing non-competitive URM Applicants

	Legacy and Athlete					Non-Legacy and Non-Athlete				
Classes	White	African American	Hispanic	Asian American	Unknown	White	African American	Hispanic	Asian American	Unknown
Panel A: Applications										
2000–2002	1,952	150	66	139	683	17,764	2,728	3,323	10,179	5,901
2003–2005	2,184	135	90	158	651	20,260	3,262	3,780	10,752	5,399
2006–2008	2,367	165	93	171	436	23,445	3,601	4,674	12,600	3,123
2009–2011	2,176	193	116	188	522	21,736	4,365	7,032	14,284	5,292
2012–2014	2,150	187	130	259	500	27,108	5,208	8,391	17,775	6,068
2015–2017	2,243	213	170	320	301	32,940	6,051	9,750	21,591	6,084
Panel B: Admits										
2000–2002	886	59	23	75	328	1,756	515	507	1,007	687
2003–2005	1,033	62	36	88	273	1,901	527	509	880	433
2006–2008	1,055	85	38	64	164	2,043	518	498	1,018	208
2009–2011	946	88	55	73	203	1,748	574	533	1,084	364
2012–2014	912	82	53	104	215	1,783	605	566	1,128	407
2015–2017	946	91	74	151	116	1,641	604	575	1,094	291

Note: Domestic applicants only. Harvard changed its recruitment of NLNA African American and Hispanic applicants at around the Class of 2008 (see Arcidiacono, Kinsler, and Ransom, 2021). We correct for changes in the applicant pool induced by these new recruiting efforts by assuming that the growth rate in applications for these groups in the post-2008 period has the same ratio as the growth rate for these two groups and Asian American applicants in the pre-2008 period. That is, we compute the number of African American NLNA applicants for t after 2008 as follows:

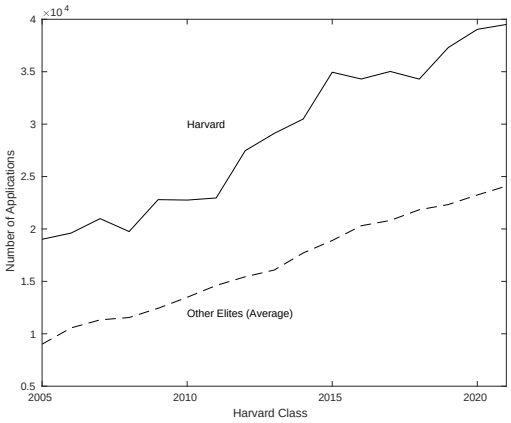
$$N_{b,t} = \gamma_{0,b} + t \cdot g_a \frac{g_{b,\text{pre-2008}}}{g_{a,\text{pre-2008}}}$$

where $\gamma_{0,b}$ is the intercept on a linear trend of all African American NLNA applications (including those induced by additional recruitment efforts), g_a is the linear trend for Asian American NLNA applications over the entire period, and $g_{r,\text{pre-2008}}$ for $r \in \{b, a\}$ are respectively the pre-2008 linear trends in applications for African American NLNA and Asian American NLNA applications. We repeat this process for Hispanic NLNA applicants.

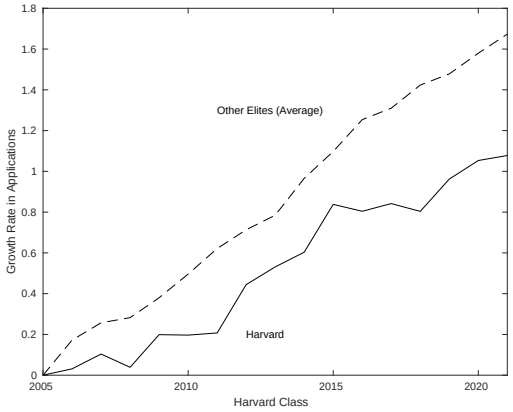
Source: Authors' calculations from *SFFA v. Harvard* Trial Exhibit DX 042.

Figure B2: Application Trends at Harvard and Other Elites

(a) Total Applications



(b) Application Growth



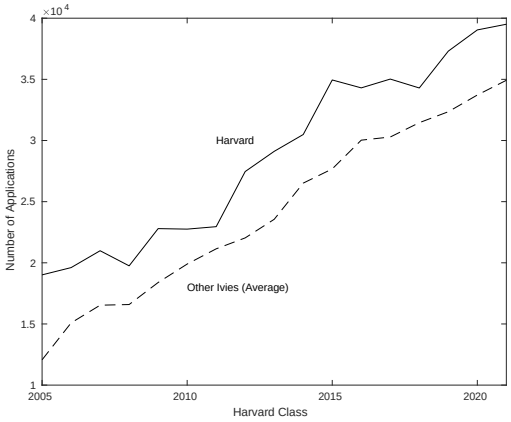
Notes: Panel (a) lists, by year, the total number of applications submitted to Harvard, compared to the total number of applications submitted to Other Elites divided by the number of Other Elite universities. Panel (b) lists growth rates based on the numbers presented in Panel (a).

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.

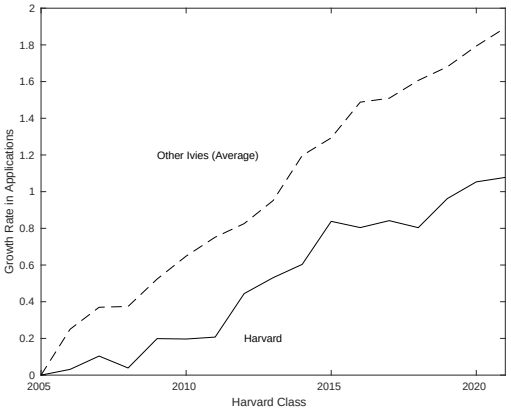
Source: Authors' calculations from *SFFA v. Harvard* Trial Exhibit DX 042 and US National Center for Education Statistics' Integrated Postsecondary Education Data System (IPEDS).

Figure B3: 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).

C Counterfactual Academic Ratings Distributions

This appendix describes how we construct counterfactual academic ratings distributions to satisfy a particular ALDC/non-ALDC admit rate ratio. We hold constant the admit rate conditional on receiving a particular academic rating score.

The distribution of ALDC applicants across levels of the academic rating in the current period is available in Table 2. Suppose that in this period the ratio between the average admission probability of ALDC applicants and that of non-ALDC applicants was Y. Suppose that in a prior period it was X, where $X < Y$. Further suppose that the reason for the increase from X to Y was that the ALDC applicants were getting relatively stronger. That is, suppose that the admissions preference for ALDC applicants was fixed.

In this scenario, we show what the academic rating distribution must have looked like for ALDC applicants if all the increases in admission advantage were due to the ALDC applicant pool getting stronger. This requires shifting ALDC applicants across the academic rating distribution while holding fixed the ALDC admission advantage for a given academic rating. We hold constant the distribution of non-ALDC applicants since X and Y are relative comparisons.

Denote $t = 1$ and $t = 0$ as the post and pre periods, respectively. Denote the probability of being admitted in period t given special status s (for ALDCs, $s = 1$) in rating level d by p_{sdt}. Denote the share the share of applicants with a particular rating level as π_{sdt}. Then for the ratio of average admit probabilities to be Y in period 1, the following must hold:

$$Y = \frac{\sum_d \pi_{1d1} p_{1d1}}{\sum_d \pi_{0d1} p_{0d1}} \tag{C.1}$$

Now we want to change the π_{1d1}'s such that the ratio changes to X using a one-parameter

adjustment. Given the π_{1d1}'s, we can express them instead as coming from an ordered logit:

$$\begin{aligned}
\pi_{111} &= \frac{1}{1+\exp(-\kappa_1)} \\
\pi_{1j1} &= \frac{1}{1+\exp(-\kappa_2)} - \frac{1}{1+\exp(-\kappa_1)} \qquad \text{for } 1 < j < D \\
\pi_{1D1} &= 1 - \frac{1}{1+\exp(-\kappa_{D-1})}
\end{aligned} \tag{C.2}$$

where D refers to the top rating level and $\kappa_i < \kappa_j$ for $i < j$.

A shift in the academic distribution involves moving the cutpoints (the κ's) by the same amount. We then look for a Δ such that:

$$\begin{aligned}
\pi^*_{111} &= \frac{1}{1+\exp(\Delta-\kappa_1)} \\
\pi^*_{1j1} &= \frac{1}{1+\exp(\Delta-\kappa_2)} - \frac{1}{1+\exp(\Delta-\kappa_1)} \qquad \text{for } 1 < j < D \\
\pi^*_{1D1} &= 1 - \frac{1}{1+\exp(\Delta-\kappa_{D-1})}
\end{aligned} \tag{C.3}$$

and where the ratio of average admit probabilities is now X:

$$X = \frac{\sum_d \pi^*_{1d1} p_{1d1}}{\sum_d \pi_{0d1} p_{0d1}} \tag{C.4}$$

which after the relevant substitutions is just one equation and one unknown. We can then see how much worse the distribution for ALDC applicants would need to have been relative to non-ALDC applicants to produce a ratio of X rather than Y.

Table C1 illustrates the results of this exercise when $X = 4$, the approximate LA/NLNA admit rate ratio in 2000, and $Y = 8$, the ALDC/non-ALDC admit rate ratio for the classes of 2014-2019. Recall that we assume that the ALDC and LDC counterfactual admit rates by academic rating are identical to the baseline admit rates. This ensures that we hold preferences for these groups fixed as we shift applicants across the academic rating distribution.

The first panel shows that 90% of the ALDC applicants would need to receive an academic rating of 4 or worse to obtain an admit rate ratio of 4:1. This massive shift is driven in part by the high athlete admit rates at the bottom of the academic rating distribution. In the second panel, we assume all athlete applicants face an admission probability of 50%, and find

the distribution of LDC applicants that will generate an overall ALDC/non-ALDC admit rate ratio of 4:1. In this case we find that approximately 40% of LDC applicants would have to receive a 4 or worse on the academic rating.

Table C1: Counterfactual Ratings Distributions

(a) No Restrictions on Athlete Admit Rate

	Typical		ALDC Baseline		ALDC Counterfactual	
Academic Rating	Admit Rate	Share	Admit Rate	Share	Admit Rate	Share
1	66.18	0.43	96.72	0.83	96.72	0.01
2	10.02	41.85	53.17	46.33	53.17	0.92
3	2.40	40.55	35.47	44.22	35.47	9.05
4	0.02	12.73	30.87	7.90	30.87	48.70
5	0.00	4.44	7.41	0.73	7.41	41.32
Weighted Average	5.45		43.61		21.80	
ALDC/Typical Ratio			8.00		4.00	

(b) Set Counterfactual Athlete Admit Rate to 50%

	Typical		LDC Baseline		LDC Counterfactual	
Academic Rating	Admit Rate	Share	Admit Rate	Share	Admit Rate	Share
1	66.18	0.43	96.67	0.99	96.67	0.11
2	10.02	41.85	49.01	51.61	49.01	11.04
3	2.40	40.55	18.09	40.46	18.09	49.12
4	0.02	12.73	3.49	6.17	3.49	33.38
5	0.00	4.44	0.00	0.76	0.00	6.36
Weighted Average	5.45		33.79		15.56	
LDC/Typical Ratio			6.20		2.86	
ALDC/Typical Ratio			8.00		4.00	

Note: Domestic applicants only. Admit rates and shares are expressed as percentages.
Source: Derived from data presented in Trial Exhibit P618 and methodology described in Appendix C.