Grade Inflation at More- and Less-Affluent High Schools

Zachary Bleemer[a,b]

[a] *Department of Economics, University of California, Berkeley*
[b] *Center for Studies in Higher Education, University of California, Berkeley*

UC-CHP Policy Brief 2020.1
February 2020

If more-affluent high schools inflate their top students' grades more than less-affluent schools over time, then grade inflation could exacerbate socioeconomic stratification across universities. This brief describes trends in top-performing students' weighted grade point averages at more- and less-affluent California high schools between 2003 and 2011. While top students at more-affluent schools earn higher average grades, the gap between top students' grades at more- and less-affluent schools actually shrank during the period, and the persistent gaps across schools can be wholly explained by test score differences. GPA-inflating AP and IB course enrollment, however, has long expanded faster at more-affluent schools. The evidence suggest that grade inflation has likely not recently hindered lower-income students' access to selective universities.

1 Introduction

Two frequently-discussed recent reports have documented evidence that more-affluent high schools inflate their students' grades at a faster rate than less-affluent schools (Hurwitz and Lee, 2017; Gershenson, 2018).[1] These findings suggest that grade inflation may contribute to declining intergenerational mobility in the United States, with higher-income students increasingly likely to be admitted to selective universities as a result of their inflated grade point averages (GPA).

These previous analyses are importantly limited along two dimensions. First, both focus on average *median* grades across high schools, but medians are unrepresentative of the high-grade students who submit competitive applications to highly-selective universities.[2] Grade inflation may follow a different trend among high-rank students. Second, both analyze "unweighted" overall high school GPAs, including grades in elective (and senior-year) courses likely ignored by most selective admissions offices while omitting the additional grade points usually awarded for honors or advanced coursework.[3]

Thanks to Jesse Rothstein for helpful comments. The author was employed by the University of California in a research capacity throughout the period during which the study was conducted. Remaining errors are my own.

[1] For recent media attention, see The Atlantic, The Washington Post, the Los Angeles Times, and USA Today.

[2] Hurwitz and Lee (2017) also present average median grades among SAT-takers (about 60 percent of high school graduates), which still results in an analyzed quantile of students with far lower grades than those enrolling at highly-selective universities. About 45 percent of high school graduates enroll at four-year universities, but the large majority of those institutions admit nearly-all applicants. For context, the University of California is tasked by the Master Plan for Higher Education with enrolling the top 12.5 percent of California high school graduates.

[3] Both studies have also faced criticism for the appearance of conflicts of interest. As many universities have chosen to eliminate standardized tests from their undergraduate applications, proponents of standardized tests (and the organizations that profit from them) have a political interest in undermining the usefulness of alternative measures of college applicants' preparedness like high school GPAs. Michael Hurwitz (of Hurwitz and Lee (2017)) was at the time the Senior Director of Policy Research at the College Board, administrator of the SAT exam, and the organization that published Gershenson (2018) – the Thomas B. Fordham Institute – includes College Board's Chief of Global Policy and External Relations, Stefanie Sanford, on its Board of Trustees.

This brief leverages a novel data source covering most of the public and private high schools in one state – California – to estimate weighted-GPA sophomore- and junior-year grade inflation at the top of schools' grade distributions. It presents trends in high schools' average *96th percentile* of grades; that is, the average grades of a group of high-performing students likely to enroll at selective universities (even coming from low-performing high schools). More- and less-affluent schools are identified in two ways: by the proportion of their students eligible for free or reduced price lunch and by the median family income of the schools' top students.

The presented evidence shows that top students at affluent high schools earn substantially higher grades than top students at less-affluent high schools, but these gaps can be wholly explained by differences in students' academic performance observable in standardized test performance. These students average grades swiftly rose between 2003 and 2011, but rose slightly *slower* at more-affluent schools relative to less-affluent schools. Grades rose at a particularly slow pace at non-Catholic private schools, likely because top students at those schools had reached the natural ceiling imposed by GPA calculations.

The brief ends with a discussion of possible mechanisms that could explain the observed grade inflation patterns. Top students' test scores consistently rose over the period at all California high schools, but test performance cannot explain less-affluent schools' slightly higher average grade inflation in the period. Grade inflation trends are also unlikely to be explained by increasing access to GPA-boosting AP and IB courses; access to college-level courses – as measured by the number of available college-level courses and the proportion of sophomore- and junior-year core course enrollments that are in AP or IB courses – has persistently risen faster at more-affluent California high schools than at less-affluent schools. Instead, the observed patterns are more consistent with slight mean reversion in teacher generosity: top students' grades at many affluent high schools appear so high that there's little room for additional improvement, while bottom-quintile public schools' grades are sufficiently low as to allow substantial increases in letter-grade course performance over time.

These results suggest that grade inflation does not unduly benefit top students from affluent schools when they apply to selective universities, though those students continue to benefit from the higher distribution of grades awarded at their schools.

2 Background and Data

College students are highly stratified across universities by family income, with students from higher-income families enrolling more at more-selective universities, and this stratification is an important contributor to the intergenerational transmission of income.[4] As a result, there has been substantial recent attention on the various factors used by selective universities to choose their students, with particular interest in identifying factors that may give an unfair edge to affluent applicants.[5]

High school grade point averages (GPAs) have long been a key factor in many selective universities' admissions decisions, especially among public universities.[6] Median high school grades have been trending upward across the country since at least the mid-1990s, and the trend appears more severe at affluent high schools (Gershenson, 2018; Hurwitz and Lee, 2017).[7] If high school grades provide an increasing advantage to affluent applicants to selective research universities, then current admissions practices could further exacerbate socioeconomic stratification across universities by decreasing less-affluent applicants' likelihood of admission to selective universities.[8]

Most selective university students graduated near the top of their high schools' grade distribution, where grade inflation patterns may differ from those experienced by median students.[9] Those universities usually construct specially-calculated weighted GPA measures in place of students' simple overall GPA. For example, each of the nine undergraduate University of California campuses treat students' "weighted a-g course GPA" as one of the fourteen factors used to admit undergraduates, restricting the GPA calculation to specifically-designated core 'a-g' courses (like history and English) and up-weighting UC-certified honors and college-level courses by awarding them an additional grade point.[10] As a result, previous measures of grade inflation trends may differ from the trends that are relevant to selective universities' admission decisions.

This brief presents grade inflation statistics calculated for most California high schools between 2003 and 2011

[4] See Chetty et al. (forthcoming) and Rothstein (2019).

[5] E.g. Geiser (2015); Declercq and Verboven (2018).

[6] See, e.g., Cohn et al. (2004). IPEDS data show that in 2018, 82 percent of four-year universities required applicants to submit GPAs, with most of the remaining schools "recommending" GPA submission.

[7] Stagnation on standardized test performance suggests that this 'grade inflation' trend reflects changes in grading practices rather than widespread improvement in course performance Hurwitz and Lee (2017).

[8] The Los Angeles Times reports that Jessica Howell, vice president of research with the College Board, recently argued that "a greater reliance on high school grades in the name of equity [is] 'misguided' because research has shown that grade inflation occurred more often at affluent schools," citing Gershenson (2018). This was also the primary argument made by Kim Wilcox, chancellor of UC Riverside, in his LA Times defense of standardized testing.

[9] By "selective" I mean any university that admits fewer than 50 percent of its applicants. In 2018, IPEDS data show that the US had 333 four-year selective universities (19 percent) which enrolled 22 percent of first-time degree-seeking undergraduate students.

[10] See UC's comprehensive review website.

Table 1: *Sample Selection and Descriptive Statistics*

	All CA Schools	ELC Schools	Balanced Sample
# of Schools	2,172	1,420	957
Avg. 96th %ile GPA		4.03	4.04
Med. Fam. Income ($)	69,000	67,000	69,000
Near 96th %ile		72,300	74,700
Avg. SAT Score	1662	1667	1692
Near 96th %ile		1758	1789
Public High Schools			
# of Schools	1,213	980	724
Avg. # of Students	1,450	1,702	2,028
Avg. % FRPL	42	42	39
Private High Schools			
# of Schools	959	440	233
% Schools Catholic	13	24	39
% UC Applicants Cov.	100.0	97.4	87.8
% Pub. HS Stud. Cov.	100.0	94.9	83.5
% Priv. UC App's Cov.	100.0	87.4	74.0

Note: Descriptive statistics of all California high schools, schools that participated in the University of California's Eligibility in the Local Context (ELC) program, and schools with observable ELC eligibility thresholds in every year between 2003 and 2011. Average SAT score and family income from among UC applicants; 'near 96th percentile' restricts to applicants within 0.3 GPA points of their school's ELC eligibility threshold. Applicants with unobserved family income are assumed to have above-median family incomes. School number of students and free and reduced price lunch recipience only observed for public high schools; reported statistics from 2007-2008. Catholic schools identified by text match with complete school list available from Wikipedia. The bottom three rows show the percent of UC applicants, all public high school students, and private high school UC applicants who were enrolled at schools in the given sample. Public high school statistics matched by CDS code. High-school-level family income statistics originally produced by the UC Office of the President for institutional research purposes; see **?**.

Source: UC Corporate Student System and CA Department of Education

by the University of California Office of the President (UCOP).[11] The University of California (UC) spans California's ten public research universities, and its relatively low cost and strong national reputation led nearly all top California high school graduates to apply to at least one of its campuses Bleemer (2018). Prior to their application, however, California high schools directly provided UCOP with the student transcripts of the top 10 percent of its incoming senior-year students by overall GPA every summer. UCOP then calculated an admission-relevant weighted GPA using only 11 core courses taken in the sophomore and junior year – two years of English and Mathematics; one year of History, Lab Science, and Non-English Language; and four other UC-approved courses – and determined the school's 96th percentile of grades, their particular statistic of interest.[12]

While the student transcripts used to calculate schools' 96th percentile grades (along with the originally-calculated thresholds) have been destroyed, Bleemer (2018) reconstructs UCOP's measurements of each school's 96th percentile weighted GPAs using contemporaneous UC admissions records.[13] The resulting school-year database is matched to an indicator of whether each high school is private or public, and private high schools are categorized as Catholic or non-Catholic on the basis of a text match with a complete list of California Catholic high schools.[14] In order to balance the panel, I omit schools that open or close during the sample period or do not have estimable ELC GPAs for more than one year across the sample period.[15]

High schools' affluence is characterized in two ways. First, each public high school is matched to its 2007-08 free and reduced price lunch recipience rate, a measure of the average affluence of the school.[16] In order to better

[11] 96th percentile GPA estimates were calculated the University of California's Eligibility in the Local Context program (Bleemer, 2018), a top percent policy designed to guarantee UC admission to the top four percent of students at each California high school. While high schools could choose whether to participate in the ELC program, the fact that ELC provided admission guarantees for students at every participating high school strongly incentivized participation, which exceeded 98 percent among public high schools and 78 percent among private high schools by 2003 (University of California, 2002).

[12] That is, the lowest grade point average such that at least four percent of the high school's seniors had GPAs above it. See Atkinson and Pelfrey (2004).

[13] In particular, that study observes the specially-calculated ELC GPA for every UC applicant along with their high school and their eligibility status (that is, whether their ELC GPA is greater than their high school's threshold). These are used to estimate the GPA location of each threshold, usually the highest GPA such that there are no ELC-eligible students from that school-year with lower ELC GPA's than it. See Bleemer (2018).

[14] See Wikipedia.

[15] A school's ELC GPA cannot be calculated if the applicant pool across all nine UC campuses from that school-year does not include at least one ELC-eligible and one ELC-ineligible student with calculated ELC GPAs, or if the school did not participate in ELC in that year.

[16] Free and reduced price lunch recipience data from the California

characterize the affluence of top students at each (public and private) high school, I also observe the median family income of 2003-2011 University of California applicants from each school, overall and (more importantly) among applicants close to their school's 96th percentile.[17]

Table 1 presents descriptive statistics of the full and restricted samples of California high schools. Of the 2,172 high schools that graduated California students between 2003 and 2011, only 1,420 ever participated in the ELC program, but those schools enrolled 95 percent of public high school students and over 97 percent of University of California applicants, a useful proxy for the pool of students who could enroll at selective universities. These schools have an average 96th percentile weighted GPA of 4.03, with average median family incomes of $67,000 and average SAT scores of a 1667 out of 2400. Students near their schools' 96th percentile thresholds are positively selected, yielding somewhat higher average family incomes and SAT scores. The average proportion of students eligible for free and reduced price lunch (FRPL) across schools is 42 percent.

Restricting to the balanced sample of ELC-participating schools drops the sample to 957 schools, but those schools enroll almost 90 percent of 2003-2011 students who applied to the University of California. Coverage of private university UC applicants is somewhat lower, at 74 percent. Nevertheless, the sample covers the large majority of California high schools weighted by student population, including 724 public high schools and 233 private high schools. The balanced sample appears relatively representative of the unbalanced sample in terms of observable characteristics, though there is some evidence that the balanced sample is slightly positively selected; the schools have higher average SAT scores by 30 points and lower average FRPL by 3 percentage points.

3 Results

Figure 1 shows the annual average 96th percentile of grades from 2003 to 2011 at seven groups of high schools: public high school quintiles by (the inverse of) free and reduced price lunch (FRPL) recipience, Catholic high schools, and non-Catholic private high schools.[18] The chart's most notably feature is the distinct ordering of public high schools: more-affluent high schools' top students have uniformly higher average grades than top students at less-affluent schools, ordered from first quintile (4.21 average GPA in 2003) to fifth quintile (3.81 average GPA). In 2003, top students at Catholic high schools had similar average grades to those at the top quintile of public schools, while top students at non-Catholic private schools had even higher grades than the top public quintile.

Figure 1 also shows stark evidence of grade inflation at the top of the grade distribution across California high schools. Top students at the most-affluent California public schools averaged 0.11 more grade points in 2011 than they were in 2003, while average grades among top students from the least-affluent public schools rose by 0.12 grade points. The middle three quintiles all rose between 0.07 and 0.09 points, suggesting widespread grade inflation across public high schools. Interestingly, grade inflation was much lower at non-Catholic private high schools, where top students' grades were surpassed by those of the top public school quintile in the late 2000s; the private high schools' top students' grades only increased 0.03 points between 2003 and 2011, to 4.24. Catholic schools' grades rose 0.07 points.

Table 2 presents linear regression estimates of the relationship between top students' grades and high school affluence over time, estimated across California high schools.[19] The first column defines affluence across public high schools by their FRPL recipience. The baseline coefficients confirm that all California public high schools have experienced gradual grade inflation and that high-FRPL (low-affluence) schools assign lower average grades to top students. The interaction term between time trend and affluence implies that less-affluent schools experienced slightly *faster* grade inflation than more-affluent schools: top students' grades at schools with 20 p.p. higher FRPL recipience tended to increase an additional 0.012 points every ten years.

Department of Education. Schools are matched by CDS code.

[17]The University of California comprises all public research universities in California, ranging in selectivity from the highly-selective Berkeley and UCLA campuses to the less-selective Riverside and Merced campuses. Given their high quality and preferential tuition levels for in-state students, there are likely few California high school graduates who enroll at a selective university anywhere in the country without applying to at least one UC campus, excepting the small number of students who enroll under "early decision" policies. Applicants are considered 'close to' their high school's 96th percentile if their ELC GPA is within 0.3 GPA points of the estimated threshold. The approximately 14 percent of applicants with unobserved family incomes are assumed to be above median income in the median measurement (since non-submission of family income generally prohibits receipt of institutional financial aid). All statistics presented below related to family income were originally produced for institutional research purposes; see Bleemer (2020).

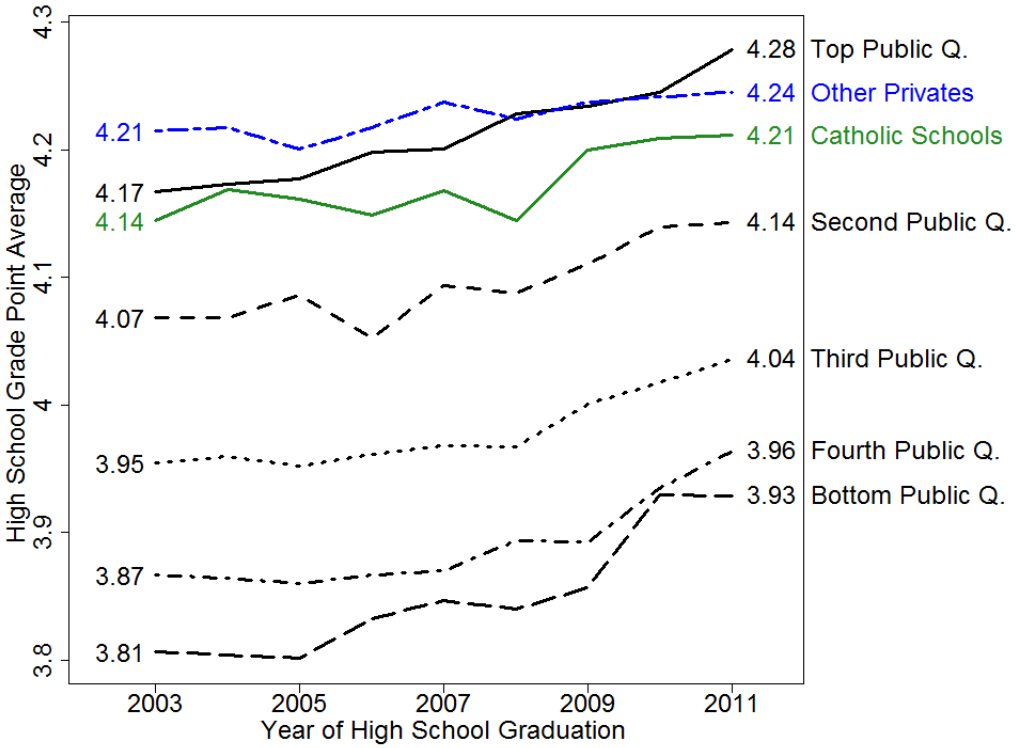
[18]The FRPL quartile cutoffs are 13%, 29%, 45%, and 63%. "Top Public Q." refers to the most-affluent high schools, as measured by having the lowest FRPL levels.

[19]The regression model is:

$$G_{st} = \beta_1 Y_t + \beta_2 A_s + \beta_3 Y_t A_s + \beta_4 X_{st} + \epsilon_{st}$$

, where G_{st} is the 96th percentile of grades at high school s in year t, Y_t is the year, and A_s is one of two measures of school affluence: the proportion of students receiving FRPL in 2007-08 or the standardized CPI-adjusted median family income of 2003-2011 UC applicants within 0.3 GPA points of their school's 96th percentile threshold. Applicants with unobserved family income are assumed to have above-median family incomes. X_{st} is either null (columns 1-2) or the average SAT score of UC applicants within 0.3 GPA points of their school's 96th percentile GPA in t (columns 3-4).

Figure 1: *Average 96th Percentile of Grades by High School, 2003-2011*



Note: Annual mean 96th percentile of grades for California public high schools by quintile of the inverse of free and reduced price lunch recipience, and for Catholic and other private high schools; the top quintile of public schools has the highest share of higher-income students (and thus the lowest share of FRPL recipients). Balanced school sample construction presented in Table 1. FRPL is measured in 2007-08 and linked by CDS code. Source: UC Corporate Student System and CA Department of Education

The second column defines high school affluence by the median family income of 2003-2011 UC applicants near their schools' 96th grade percentile, a single affluence measure that covers both private and public high schools. Incomes are standardized across the balanced sample. The interaction term implies that top students' average grades at schools with one standard deviation lower median family income rise by about 0.016 additional points each 10 years, a modest difference across schools that statistically rejects the hypothesis that top students' grade inflation is greater at more-affluent schools.

4 Discussion

Top students' grades at California's more-affluent high schools rose slightly slower between 2003 and 2011 than those of top students at California's less-affluent schools. This small but statistically-significant difference in grade inflation rates by school affluence could arise for one of at least three reasons:[20]

- Top students' actual academic performance could be improving faster at less-affluent schools.
- Top students at less-affluent schools could be increasingly enrolling in honors and college-level AP and IB courses relative to more-affluent schools, increasing their grade point averages with the weighted GPA point bonuses provided in those courses.
- Teachers at less-affluent schools could be increasingly generous in their grading relative to more-affluent schools.[21]

The first explanation can be tested in part by analyzing whether less-affluent schools' top students' grade

[20] This decomposition is similar in spirit to that of Hernandez-Julian and Looney (2016), who study the mechanisms driving grade inflation at a selective research university.

[21] This generosity can be interpreted as teachers awarding higher grades as a result of various external incentives favoring higher grades, like their students' increased likelihood of admission to some universities. For an example of administrative policy that encourages grade inflation, see Fajnzylber, Lara, and Leóna (2019).

Table 2: *Grade Inflation over Time by High School Affluence*

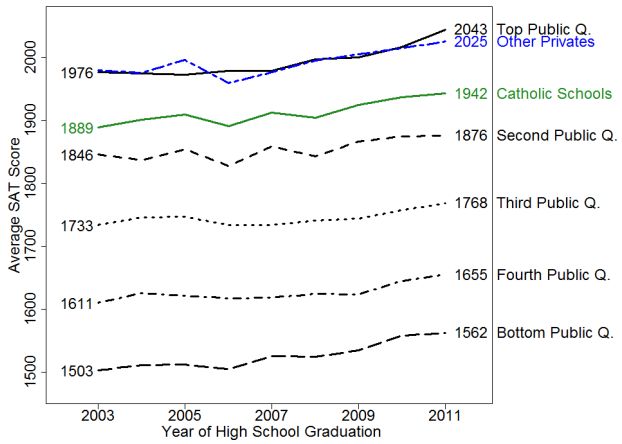
	96th Percentile of Grades			
Year	0.010	0.011	0.006	0.007
	(0.001)	(0.001)	(0.001)	(0.001)
% FRPL	-0.566		0.010	
	(0.029)		(0.030)	
% FRPL × Year	0.0060		0.0051	
	(0.0032)		(0.0030)	
Med. Fam. Inc. (Stand.)		0.168		0.028
		(0.006)		(0.006)
Med. Fam. Inc. × Year		-0.0016		-0.0019
		(0.0006)		(0.0005)
Avg. SAT /1000			0.842	0.755
			(0.025)	(0.020)
# of Obs.	6,444	8,489	6,444	8,489
Mean of Y	4.01	4.04	4.01	4.04

Note: OLS linear regression estimates of California high schools' 96th percentile of grade point averages on interactions between year (2003-2011) and two non-time-varying measures of affluence: 2007-08 percent of students receiving free or reduced price lunch (FRPL) and the median CPI-adjusted family income of 2003-2011 University of California applicants within 0.3 GPA points of their school's 96th percentile GPA (standardized across school-years in the balanced sample). Average SAT score covariate measured as the average SAT score of UC applicants within 0.3 GPA points of their school's 96th percentile GPA in each year. Balanced school sample construction presented in Table 1. FRPL is restricted to public high schools and is linked by CDS code. Applicants with unobserved family income are assumed to have above-median family incomes. Standard errors are clustered by high school. Estimates including high-school-level family income statistics originally produced by the UC Office of the President for institutional research purposes; see **?**.

Source: UC Corporate Student System and CA Department of Education

Figure 2: *Average SAT Scores of Top Students by High School*

(a) *Average SAT Scores of Top Students*



Note: The annual average SAT scores of UC applicants within 0.3 GPA points of their school's estimated 96th percentile ELC threshold, averaged by high school and then by either FRPL quintile (public) or whether the school is Catholic (private). Sample restricted to balanced sample described in Table 1. FRPL is restricted to public high schools, is observed in 2007-08, and is linked by CDS code. Catholic schools identified by text match with complete school list available from Wikipedia. Source: UC Corporate Student System and CA Department of Education

inflation can be absorbed by those students' improved SAT scores. Figure 2 shows that average SAT scores (converted to the 2400 scale) are indeed rising across all categories of California high school, with particularly large increases at top-quintile (+67 points) and bottom-quintile (+59 points) public high schools.[22]

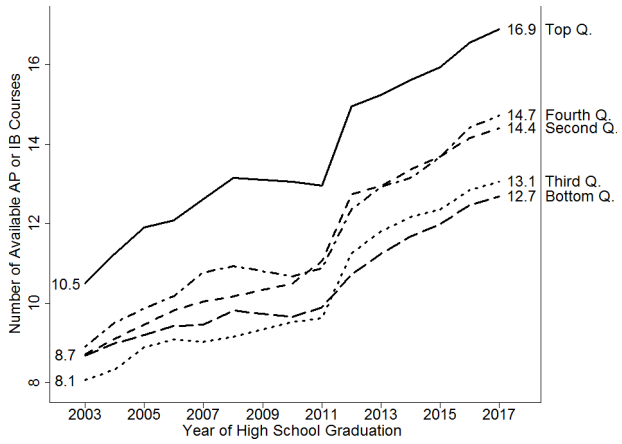
The third and fourth columns of Table 2 show increases in top students' SAT scores are indeed strongly correlated with those students' grades; an increase in average SAT scores by 100 points is associated with a 0.08 increase in GPA. Moreover, cross-high-school differences in top students' average SAT scores can almost wholly account for differences in average grades across high schools, and explain about 40 percent of overall high school grade inflation. However, changes in SAT scores are shown to hardly explain any of the estimated difference in grade inflation between more- and less-affluent high schools; holding test scores fixed, the relationship between school affluence and grade inflation remains largely unchanged in both specifications.

Finally, Figure 3 presents evidence suggesting that increases in college-level course-taking at less-affluent schools is also unlikely to explain those schools' slightly

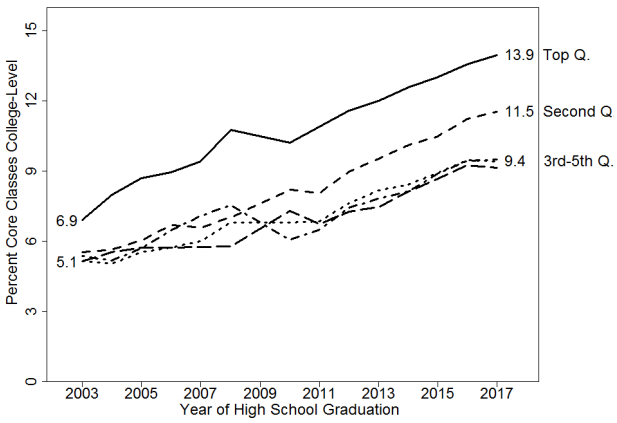
[22]While nationwide mean SAT scores were largely unchanged during this period, the increasing proportion of high school graduates completing the exam may explain top students' steadily-improving scores.

Figure 3: *Availability and Prevalence of College-Level Courses at Public High Schools*

(a) *Number of AP or IB Courses Offered*



(b) *Proportion of Sophomore/Junior Core Classes that are AP or IB*



Note: Left: The average annual number of distinct AP or IB courses offered at each public California high school, averaged by high school and then by FRPL quintile. Right: The annual proportion of sophomore- and junior-year core course enrollments – including English, History / Social Studies, Science, Mathematics, and Foreign Language – that were in AP- or IB-designated courses, averaged by high school and then by FRPL quintile. Both: Sample restricted to balanced sample described in Table 1. FRPL is restricted to public high schools, is observed in 2007-08, and is linked by CDS code. Source: UC Corporate Student System and CA Department of Education

higher level of grade inflation. The figure, constructed with course-level data from the California Department of Education, presents (a) the annual number of available AP and IB courses and (b) the proportion of all sophomore- and junior-year core course enrollments that were in AP- or IB-designated classes, averaged by public high school quintile.[23] The latter panel shows that college-level course-taking has persistently expanded faster at top-quintile and second-quintile high schools than at lower-quintile high schools since 2003, by 7.0 percentage points at top-quintile high schools relative to 4.3 percentage points at bottom-quintile schools. Changes in the total availability of AP and IB courses has followed a similar (though somewhat-noisier) trend. Though these charts are not restricted to 96th-percentile students, they suggest that college-level course enrollment among top students is unlikely to have grown at a faster rate at less-affluent high schools relative to more-affluent schools.

While these findings suggest that increased relative teacher generosity at less-affluent is the most likely cause of those schools' slightly higher grade inflation between 2003 and 2011, the question remains open to further research.

5 Conclusion

If grade inflation among potential selective university enrollees were more rampant at more-affluent high schools than at less-affluent schools, then the resulting potential distortion of university admission decisions in favor of higher-income applicants could be cause for concern. Prior research focusing on unweighted overall median grade point averages suggests that grade inflation is exaggerated at more-affluent schools. However, this brief shows that the choice of a GPA measure more relevant to selective university admissions decisions – up-weighting honors and college-level courses and focusing on college-preparation sophomore- and junior-year courses – as well as a more-relevant distributional moment of high school GPAs (the 96th percentile) shows that grades actually rose slightly more at *less*-affluent California high schools between 2003 and 2011. Indeed, even static grade gaps between high schools appear to be almost wholly explained by actual educational differences as captured by standardized test scores. This evidence suggests that grade inflation does not provide a growing (or even static) concern with regard to socioeconomic stratification at American universities.

References

Atkinson, Richard C. and Patricia A. Pelfrey. 2004. "Rethinking Admissions: US Public Universities in the Post-Affirmative Action Age." CSHE Research Paper Series 11 (4). URL Link.

[23] Core courses include mathematics, science, English, social studies, history, and foreign language.

Bleemer, Zachary. 2018. "Top Percent Policies and the Return to Postsecondary Selectivity." Manuscript .

———. 2020. Grade Inflation for Top California Students by High School Affluence. Oakland, California: UC Office of the President. URL Link.

Chetty, Raj, John Friedman, Emmanuel Saez, Nicholas Turner, and Danny Yagan. forthcoming. "Income Segregation and Intergenerational Mobility Across Colleges in the United States." The Quarterly Journal of Economics URL Link.

Cohn, Eichanan, Sharon Cohn, Donald C. Balch, and James Bradley Jr. 2004. "Determinants of undergraduate GPAs: SAT scores, high-school GPA and high-school rank." Economics of Education Review 23 (6). URL Link.

Declercq, Koen and Frank Verboven. 2018. "Enrollment and degree completion in higher education without admission standards." Economics of Education Review 66:223–244. URL Link.

Fajnzylber, Eduardo, Bernardo Lara, and Tomás Leóna. 2019. "Increased learning or GPA inflation? Evidence from GPA-based university admission in Chile." Economics of Education Review 72:147–165. URL Link.

Geiser, Saul. 2015. "The Growing Correlation between Race and SAT Scores: New Findings from California." CSHE Research and Occasional Paper Series 15 (10). URL Link.

Gershenson, Seth. 2018. Grade Inflation in High Schools (2005-2016). Washington, DC: Thomas B. Fordham Institute.

Hernandez-Julian, Rey and Adam Looney. 2016. "Measuring inflation in grades: An application of price indexing to undergraduate grades." Economics of Education Review 55:220–232. URL Link.

Hurwitz, Michael and Jason Lee. 2017. "Grade Inflation and the Role of Standardized Testing." In Measuring Success: Testing, Grades, and the Future of College Admissions, edited by Jack Buckley, Lynn Letukas, and Ben Wildavsky. Baltimore: Johns Hopkins University Press, 64–93.

Rothstein, Jesse. 2019. "Inequality of Educational Opportunity? Schools as Mediators of the Intergenerational Transmission of Income." Journal of Labor Economics 37 (S1):S85–S123. URL Link.

University of California. 2002. "University of California Eligibility in the Local Context Program Evaluation Report." Regents Report URL Link.